

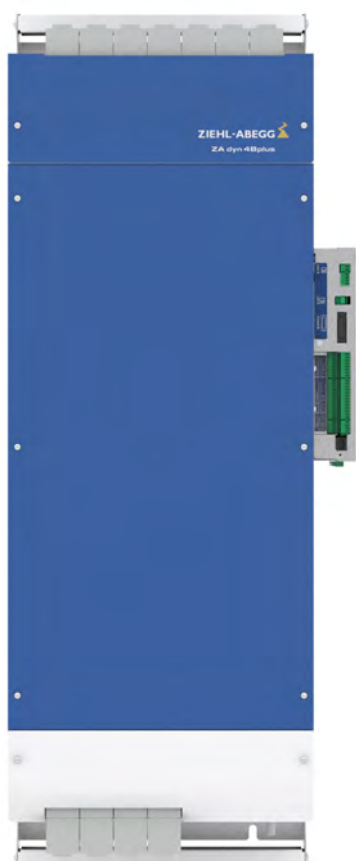
Bewegung durch Perfektion | Movement by Perfection

# ZIEHL-ABEGG



Die Königsklasse  
The Royal League

Die Königsklasse in Lufttechnik, Regeltechnik und Antriebstechnik | The Royal League in ventilation, control and drive technology



**ZA dyn 4Bplus**  
Frequency inverter

**Original operating instructions**  
Store for future use!

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## 1 General

Compliance with the following instructions is mandatory to ensure the functionality and safety of the product. If the following instructions given especially but not limited for general safety, transport, storage, mounting, operating conditions, start-up, maintenance, repair, cleaning and disposal / recycling are not observed, the product may not operate safely and may cause a hazard to the life and limb of users and third parties.

Deviations from the following requirements may therefore lead both to the loss of the statutory material defect liability rights and to the liability of the buyer for the product that has become unsafe due to the deviation from the specifications.

### 1.1 Validity

This instruction manual applies to:  
frequency inverter from the series:ZAdyn4Bplus  
as of software version 4.71.2

### 1.2 Meaning of the operating instructions

These operating instructions help you to work safely on and with the frequency inverter ZAdyn4Bplus. They contain safety instructions that must be complied with as well as information that is required for failure-free operation of the frequency inverter.

The operating instructions are to be stored together with the frequency inverter. It must be ensured that all persons who have to perform activities on the frequency inverter can consult the operating instructions at any time. Instructions for use in accordance with the German Occupational Safety and Health Act and the German Work Equipment Ordinance must be provided in addition to the operating instructions.

Keep the operating instructions for continued use. They must be passed-on to all successive owners, users and final customers.

### 1.3 Target group

The operating instructions address persons entrusted with planning, installation, start-up, maintenance and servicing, who have the corresponding qualifications and skills for their job.

### 1.4 Structure of operating instructions

The operating instructions have a systematic structure. The order of the individual chapters corresponds to the order of the work steps for first time installation of the frequency inverter.

**The operating instructions contain the following information:**

- Device description
- Mechanical and electrical installation
- Accessories
- Operation and parameterising
- Commissioning
- "Safe Torque Off (STO)" function
- Parameter list
- Drive options and special functions
- Evacuation mode
- Diagnostic
- Software ZAMon
- Enclosure



### 1.5 Exclusion of liability

It has been established that the content of these operating instructions is concurrent with the frequency inverter hardware and software described.

It is still possible that non-compliances exist; no guarantee is assumed for complete conformity. The contents of this manual are put through periodic reviews. Necessary modifications are incorporated into the next version.

ZIEHL-ABEGG SE is not liable for damage due to misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications.

### Symbols description

	<p><b>Asynchronous motors</b>                  The contents in the operating instructions refer specifically to the operation of asynchronous motors.</p>
	<p><b>Synchronous motors.</b>                  The contents in the operating instructions refer specifically to the operation of synchronous motors.</p>

### 1.6 Copyright

These operating instructions contain copyright protected information. The operating instructions may be neither completely nor partially photocopied, reproduced, translated or put on data medium without previous explicit consent from ZIEHL-ABEGG SE. Infringements are liable for damages. All rights reserved, including those that arise through patent issue or registration on a utility model.

### 1.7 Explanation of symbols and designators

Symbol	Meaning
▷	Instruction. Follow the instructions in sequence in the order described.
✓	Result of an action (result). Here, the result of an action is described.

## 2 Safety instructions

### 2.1 General

This chapter contains instructions to prevent personal injury and property damage. These instructions do not lay claim to completeness. In case of questions and problems, please consult our company technicians.

### 2.2 Intended use



The ZAdyn4Bplus is a field-orientated Frequency inverter for RPM control of asynchronous motors and synchronous motors. The device is not designed for any other use than those listed here – this is considered as improper use.




Reading these operating instructions and complying with all contained instructions – especially the safety instructions contained therein – are considered part of intended use. Furthermore, carrying out all inspection work in the prescribed scheduled intervals is part of intended use

Not the manufacturer, rather the operator of the ZAdyn4Bplus is liable for any personal harm or material damage arising from non-intended use!

### 2.3 Pictographs

Safety instructions are highlighted with warning triangles and are depicted according to the degree of hazard as follows.

	<p><b>Danger!</b>                  General hazardous area. Death or severe injury or significant property damage can occur if the corresponding precautions are not taken!</p>
	<p><b>Caution!</b>                  Risk of moderate or minor injury if the corresponding precautions are not taken!</p>

	<p><b>Caution!</b>                  Material damage is possible if the corresponding precautions are not taken!</p>
	<p><b>Danger!</b>                  Danger by dangerous, electric voltage! Death or severe injury can occur if the corresponding precautions are not taken!</p>
	<p><b>Information</b>                  Important information and advice for user</p>

## 2.4 Product safety

The device conforms to the state of the art at the time of delivery and is fundamentally considered to be reliable. The device and its accessories must only be used in a flawless condition and installed and operated with compliance to the operating instructions.

Exceeding the limits stated in the “Enclosure / technical data” chapter can lead to a defect in the device.

## 2.5 Requirements placed on the personnel / due diligence

Persons entrusted with the planning, installation, commissioning and maintenance and servicing in connection with the device must have the corresponding qualifications and skills for these jobs. Based on their training, knowledge and experience as well as knowledge of the relevant standards, they must be able to judge the work transferred to them and be able to recognize possible hazards. In addition, they must be knowledgeable about the safety regulations, EU directives, rules for the prevention of accidents and the corresponding national as well as regional and in-house regulations. Personnel to be trained or instructed and apprentices are only permitted to work on the device under the supervision of an experienced person. This also applies to personnel undergoing general training. Comply with the legal minimum age.

## 2.6 Commissioning



**Danger!**

During start-up, unexpected and hazardous conditions can arise in the entire system due to incorrect settings, defective components or incorrect electrical connections

**During the commissioning following has to be observed:**

- Remove all persons and objects from the hazardous area
- The EMERGENCY-STOP functions must be in working order
- The mechanical safety brakes must be installed and in working order
- Start-up is only permitted subject to compliance with the EMC Directive 2014/30/EU

## 2.7 Working on device / Hazards through residual voltage

Before working on previously installed devices, separate them from the mains and secure them against reconnection.



**Danger!**

Through use of capacitors, danger of death exists even after switching off the device through directly touching the energized parts or due to parts that have become energized due to faults.

Wait **at least 3 minutes** before working on the device.

The safe isolation from the supply must be checked using a **two-pole** voltage detector.



**Danger!**

It is generally forbidden to carry out work on electrical live parts. Protection class of the device when open is IP 00! It is possible to touch hazardous voltages directly.

## 2.8 Modifications / interventions in the device

For reasons of safety, no unauthorized interventions or **modifications** may be made on the device. All planned modifications must be authorized by the manufacturer in writing.

Use only genuine spare parts / genuine wearing parts / genuine accessories from the ZIEHL-ABEGG SE. These parts were specifically designed for the device. There is no guarantee that parts from non-original sources are designed and manufactured in correspondence with load and safety requirements.

Parts and special equipment not supplied by the ZIEHL-ABEGG SE are not approved for use.

## 2.9 Operator's obligation of diligence

The device has been designed and constructed with consideration of a hazard analysis and after carefully selecting the harmonized standards to be complied with as well as additional technical specifications. It thus complies with the state-of-the-art and ensures the highest degree of safety. However, this safety can only be achieved in practical operation when all the necessary measures are taken. The machine operator therefore has a duty of care to ensure that these measures are planned and to supervise their execution.

### In particular, the operator must ensure that

- The device is only used as intended (cmp. chapter "Product overview" concerning this)
- The installation is operated solely in a flawless, functional condition and that especially the safety devices are periodically checked for their properly functioning condition
- The required personal safety gear is available to and used by the operating, maintenance and repair personnel
- The operating instructions are always readily available at the location where the frequency inverter is being used, are complete and are in legible condition
- Only sufficiently qualified and authorized personnel operate, maintain and repair the device
- these staff receive regular instruction in all relevant occupational safety and environmental protection issues, are knowledgeable about the operating instructions and, especially, are familiar with the safety instructions contained therein.
- all safety and warning notices attached to the device are never removed and remain legible.

## 2.10 Employment of external personnel

Maintenance and service work is frequently carried out by external personnel who are often unfamiliar with the specific circumstances and the resulting hazards.

These persons must be comprehensively informed about the hazards in their area of activity.

You must monitor their working methods in order to intervene in good time if necessary.

## 3 Product overview

### 3.1 Application

The ZAdyn4Bplus is a field-oriented frequency inverter for speed control of three-phase motors developed for use in elevator machines.

The frequency inverter is equipped with a microprocessor control. This tracks the motor through time and distance-restricted programs that are selected using the superordinate elevator control system.

The use of IGBT modules and pulse width modulation with variable switching frequency enables low-noise operation of the motor. The user interface, interfaces and software adapted specially to lift technology enable easy installation and start-up of the frequency inverter.

The frequency inverter is designed for elevator installations for passenger and freight transport with a high demand on travel comfort and positioning accuracy.

Frequency inverters for operating asynchronous motors and synchronous motors are available.

### 3.2 Functional description

The frequency inverter provides an AC mains with variable frequency and variable voltage. The size of the voltage and frequency depends on the selected travelling speed and the load to be operated. The motor is operated optimally in all operating points by using field-orientated control. This provides every required torque almost without delay. The full rated motor torque is already available at standstill (speed 0). All speed curves are driven in a speed-controlled and load-independent manner. The field-orientated control enables very accurate compliance with the specified travel curve over the whole speed range. The closed loop control can be used up to a speed of 4 m/s (higher speeds available on request). The brakes operate almost wear-free throughout the controlled operation from speed 0 (start) to speed 0 (stop).

#### 3.2.1 centrifugal masses

In order to reduce the acceleration current, all additional centrifugal masses are to be removed. Solid hand wheels are to be replaced with plastic or aluminium hand wheels.

However, please note that by removing the centrifugal masses, it is possible that an imbalance arises

#### 3.2.2 Current consumption of the ZAdyn4Bplus in acceleration

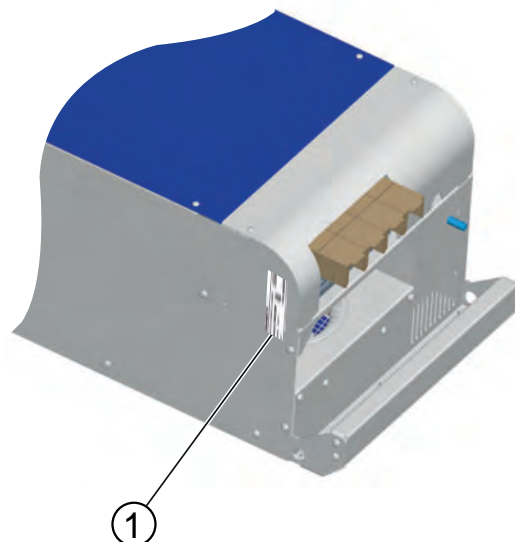
When selecting the ZAdyn4Bplus, it is assumed that the motor to be controlled is loaded with the rated torque at the rated speed. Accelerating the motor requires additional torque. Generating this torque requires additional current of approx. 40 – 80% of the rated current. During acceleration, this results in a motor current consumption of approx. 140 – 180% of the rated current.

The ZAdyn4Bplus 110-150 can be loaded with up to 180% of the rated current for up to 3 s. The ZAdyn4Bplus 220 can be loaded with up to 150% of the rated current for up to 3 s. For this reason, the current which is established when the motor accelerates may not be greater than 180% of the rated current.

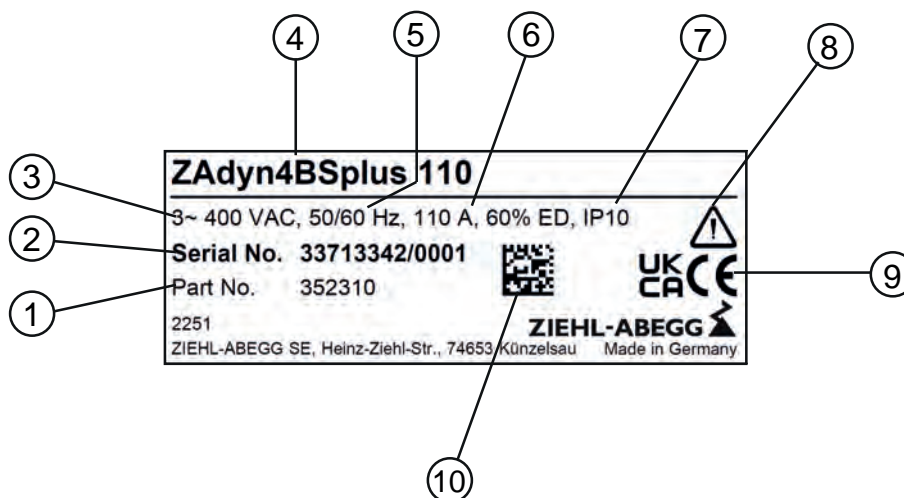
In general, valid is:

$$I_{\text{rated inverter}} \geq I_{\text{rated motor}}$$

### 3.3 Rating plate



Name plate position  
 1 Rating plate



Rating plate ZAdyn4BplusS 110

no.	Designation
1	Part no.
2	Series number
3	Mains connection voltage
4	Series
5	Mains frequency
6	Rated current for 60% on time
7	Protection rating
8	Touch current in protective earth line exceeds an alternating current of 3.5 mA, or a direct current of 10 mA
9	Confirmation of conformity with UKCA and CE directives
10	DATA MATRIX code serial number

### 3.4 Service & maintenance

These jobs must be completed during the recurrent maintenance work:

- Check the device for dirt and clean if necessary
- Check the connections and tighten if necessary

### 3.5 Transport

- The device is packed ex factory to suit the transport method previously agreed.
- Always use the original packaging materials when transporting the device
- Avoid shocks and impacts to the device during the transport

#### 3.5.1 Storage duration:

The storage duration depends particularly on the electrolytic capacitors because the oxide coating in the capacitor deteriorates.

##### Storage duration:

- 12 months at -20 ... +50 °C
- 24 months at -20 .. +45 °C
- 36 months at -20 .. +40 °C

If storage exceeds the stated maximum storage times, you must carry out a reformation of the capacitors before applying the entire mains voltage to the frequency inverter.

##### New formation:

To reform, the ZAdyn4Bplus needs to be connected to reduced voltage (230 VAC at L1 / L2) for approx. 1 hour.

### 3.6 Disposal / Recycling



Disposal must be carried out professionally and environmentally friendly in accordance with the legal stipulations.

## 4 Mechanical installation

### 4.1 General notes

The ZAdyn4Bplus is designed for installation in the switch cabinet. Wall mounting outside of the switch cabinet is not permitted.

CAUTION!

#### Caution!

Adequate cooling must be ensured. The power loss of the device (see "Technical Data" chapter) must be taken into account here.

To ensure unobstructed airflow, the device must be installed in a vertical position!



#### Danger!

The following points must be complied with during the mechanical installation to avoid causing a defect in the device due to assembly errors or environmental influences:

#### Before installation

- Remove the device from the packing and check for any possible shipping damage
- Carry out installation only on a clean, level and stable foundation
- Assemble the device outside of the traffic area

#### During installation

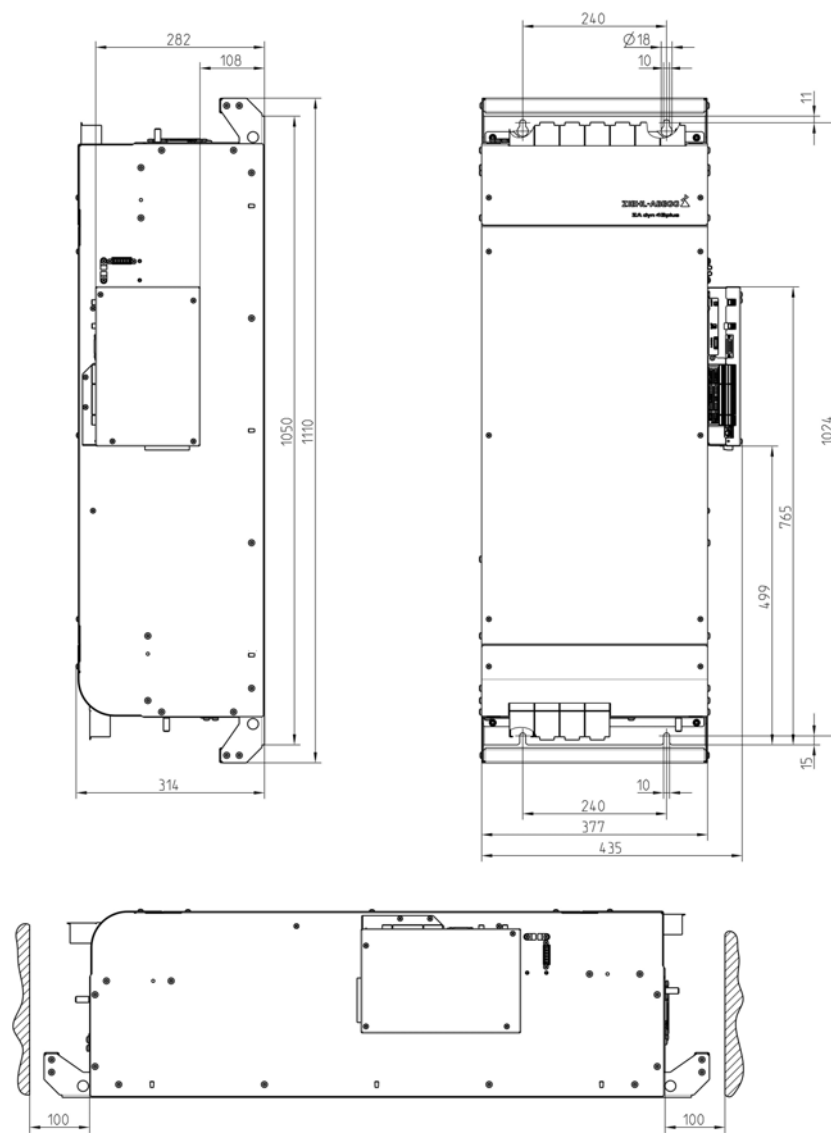
- Mount the device in torsion free conditions
- Mount the device in torsion free conditions
- Avoid that drilling chips, screws and other foreign bodies reach the interior of the device
- Maintain the stated minimum clearances to ensure unobstructed cooling-air feed as well as unobstructed outgoing air discharge (see fig.)
- To ensure EMC-acceptable installation, mount the device on a galvanized or chrome-plated and grounded mounting plate. When using a painted mounting plate, the paint must be removed from the contact-surface areas.

#### Ambient conditions

- mounting the device on vibrating components is not allowed
- The device must not be exposed to any shock.
- Prevent humidity
- Avoid aggressive and conductive materials in the environment



## 4.2 Dimensions/minimum clearances



ZD4B03M10, Index 000, 26.10.2022

ZAdyn4Bplus dimensions/minimum clearances in mm

## 5 Electrical installation



**Danger!**

It is forbidden to carry out work on the frequency inverter when it is live.  
Even after disconnection, the DC-link ( terminals X2: +DC / X2:-DC ) is still live.  
Wait at least 3 minutes before working on the device



**Danger!**

It is not permitted to operate the ZAdyn4Bplus with the housing covers removed, as exposed live parts are present inside the frequency inverter. Failure to observe this provision can lead to serious injury.

**Caution!**

Parts can be destroyed by electrostatic discharge.  
Discharge yourself by suitable action before working on electrical components (connectors, etc.). You can do this, for example, by touching earthed metal parts.

Work on electric components may only be carried out by trained electricians or by persons instructed in electricity under the supervision of an electrician in accordance with electrical engineering regulations.

A second person must always be present when working on energized parts or lines who disconnects in case of emergency.

Electrical equipment must be checked regularly: Loose connections are to be re-tightened and damaged cables must be replaced immediately.  
Always keep switch cabinets and all electrical supply facilities locked. Access is only allowed for authorized persons using a key or special tool.

Never clean electrical equipment with water or similar liquids.

## 5.1 EMC-compatible installation

### 5.1.1 Standards

When correctly installed, the frequency inverter corresponds to the following standards:

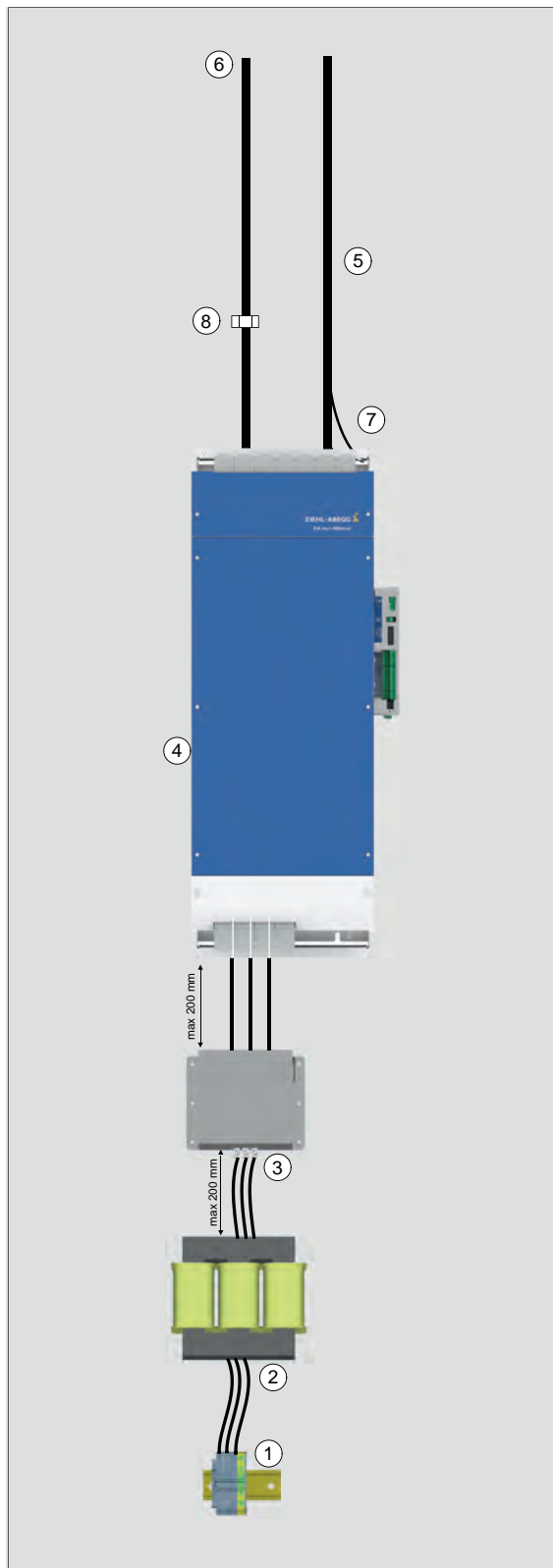
- EN 12015:2014 Electromagnetic compatibility – Product family standard for lifts, escalators and moving walks – Emission
- EN 12016:2013 Electromagnetic compatibility – Product family standard for lifts, escalators and moving walks – Interference immunity

### 5.1.2 Electrical connection

Lead	Cable length	Earthing the screening	ZAdyn4Bplus shield coating version
Power line	-	-	-
Motor cable	Max. 25 m	elevator control system ZAdyn4Bplus	Clip on mounting plate
Brake chopper/brake resistor line	Maximum 5 m	elevator control system ZAdyn4Bplus	Pigtail on threaded bolt of protective earth connection
Connecting line for the digital inputs	Max. 25 m	-	-
Connecting lines for the digital outputs	Max. 25 m	-	-
Rotary encoder line	Max. 25 m	elevator control system ZAdyn4Bplus	Via connector
Temperature monitoring of brake resistor	Maximum 5 m	ZAdyn4Bplus	Pigtail
STO line	Max. 50 m	elevator control system ZAdyn4Bplus	Earthing clip
connecting cable ZApad/ZAmon STICK	Max. 50 m	elevator control system ZAdyn4Bplus	Via connector
Connecting line of rotary encoder simulation	Max. 25 m	elevator control system	-
Connecting line for CAN interface	<ul style="list-style-type: none"> <li>• Main line: Max. 200 m</li> <li>• Stub lines: Max. 6 m</li> </ul>	-	-
Connecting cable DCP interface	Max. 50 m	ZAdyn4Bplus	Earthing clip
Connecting line for brake release monitoring	Max. 25 m	-	-

- Do not twist shielding for connections; use a suitable shield connection system
- Run the control cables and the encoder cables separate from the power cables
- Provide connected inductances (brakes, contactors) with suppressors
- In order to use the ZAdyn4Bplus safely and in compliance with standards, a power choke of type ND... from ZIEHL-ABEGG must be integrated into the power line. For assignment of the frame sizes of the ZAdyn4Bplus to the respective power chokes, refer to chapter "Electrical installation/-Mains connection".
- Operating the ZAdyn4Bplus without the ND.. type power choke voids all warranty entitlements.
- In the case of a supply line of > 25 m (motor line) or > 5 m (brake resistor line), adherence to standard **EN 12015** (Electromagnetic compatibility – Emission) and **EN 12016** (Electromagnetic compatibility – Interference immunity) can no longer be guaranteed.
- If you must interrupt the shielding on a particular line (e.g. to install motor contactors), the shielding must be subsequently continued with the lowest possible HF impedance.
- Use shielded lines in the switching cabinet also
- When using motor contactors, the voltage supply of the contactors must be routed via the line filter of the elevator control.

### 5.1.3 EMC-compatible assembly of the control cabinet



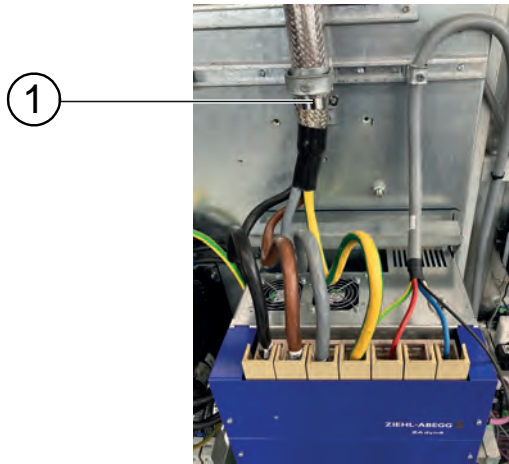
The following points must be observed if the in chapter 5.1 mentioned standards are to be adhered to:

- see chapter 5.1
- Leadlength between radio interference filter and line reactor max. 200mm
- Cable length between power choke and ZAdyn4Bplus maximum 200 mm
- Route the mains supply line (including the mains connection terminal, radio interference filter and line reactor) separately from the brake resistor cable and the motor cable

- 1 Mains supply terminal
- 2 Line reactor ND
- 3 Radio interference filter FEF
- 4 ZAdyn4Bplus
- 5 Brake resistor cable (shielded)
- 6 Motor cable (shielded)
- 7 Shielding (brake resistor cable)
- 8 Cable clamp (shielded)

#### 5.1.4 Motor cable, brake resistor cable

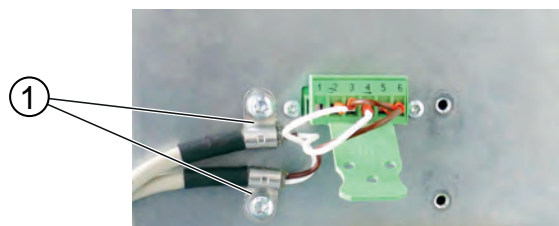
- The screening of the motor cable and the screening of the brake resistor cable must be extensively connected to the earth potential in the immediate vicinity of the ZAdyn4Bplus. The screening must be continued right up to the connection terminal.
- We recommend fixing the shielding on the mounting plate by means of a clip (see Fig.).



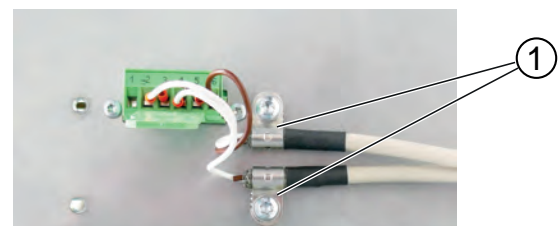
Fixing the shielding on the mounting plate  
1 Clip

#### 5.1.5 STO line

Shielded cables must be used for the STO signals. The shield must be fitted on both sides. The screening of the STO lines must be connected to earth potential over a large area on the inverter side. Earthing clips are provided on the ZAdyn4Bplus for this purpose (see fig.).

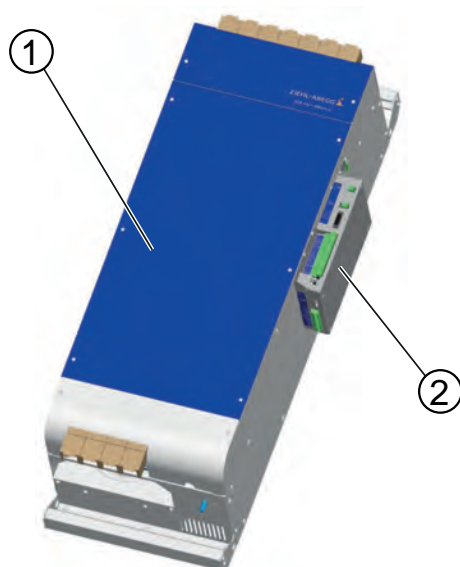


X-STO connection terminal  
1 Earthing clips



X-STO connection terminal  
1 Earthing clips

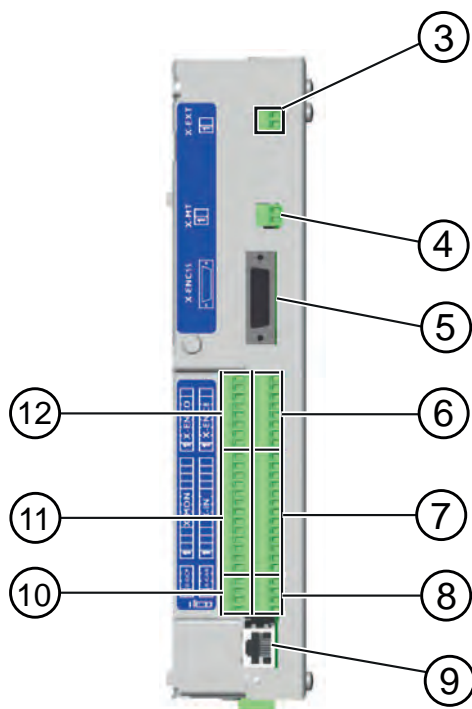
## 5.2 Device structure/position of connection terminals



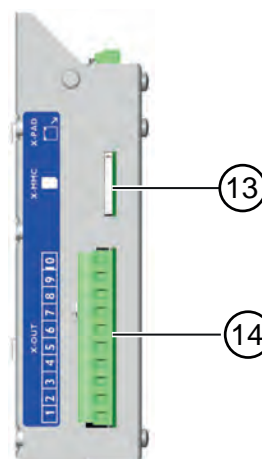
ZAdyn4Bplus device structure  
 1 Power unit  
 2 Controller unit (with control inputs and control outputs)



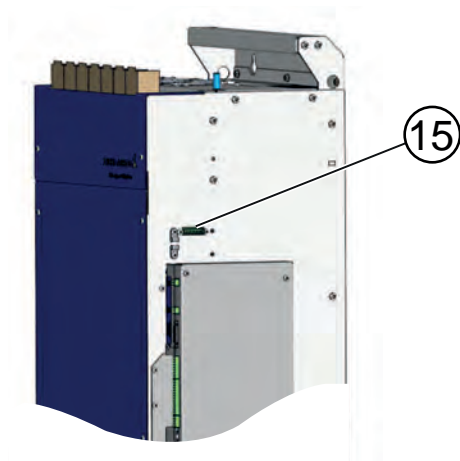
Position of connection terminals on power unit  
 1 Motor/brake chopper/brake resistor  
 2 Mains connection



Position of connection terminals on front of controller unit  
 3 X-EXT external 24V power supply  
 4 X-MT motor temperature monitor  
 5 X-ENC15 impulse encoder SUB-D  
 6 X-ENC8 impulse encoder  
 7 X-IN digital inputs  
 8 X-CAN CAN  
 9 X-PAD ZApad  
 10 X-DCP DCP  
 11 X-MON inputs for monitoring functions  
 12 X-ENCO encoder simulation



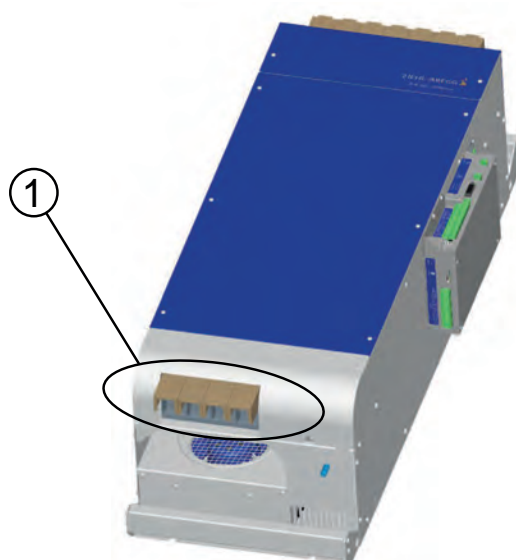
Position of connection terminals on bottom of controller unit  
 13 X-MMC memory card  
 14 X-Out digital outputs



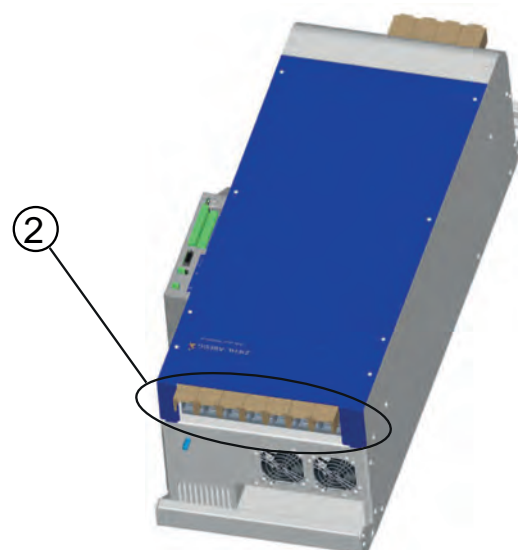
15 X-STO Safe Torque Off

### 5.3 Wiring

The cores of the mains supply line, the motor cable and the brake resistor cable are routed through the terminal covers on the top and bottom of the housing (see fig.).



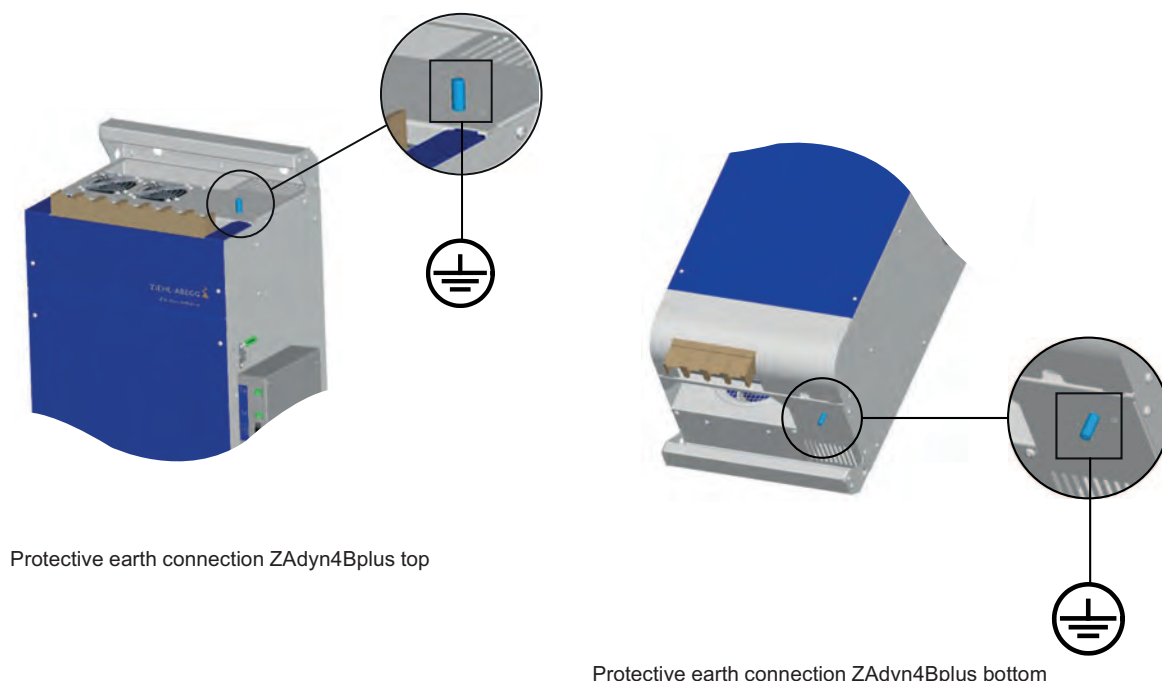
Cable routing on bottom ZAdyn4Bplus  
 1 Terminal covers for mains supply line



Cable routing on top ZAdyn4Bplus  
 2 Terminal covers for brake resistor cable, motor cable

### 5.4 Protective ground connection

- The touch current of the ZAdyn4Bplus is more than 3.5 mA alternating current. Therefore, the connection for the ZAdyn4Bplus must be fixed in accordance with EN 61800-5-1 with a cross-section of at least 10 mm<sup>2</sup>.
- If cores L1, L2 and L3 of the mains supply line have a cross-section of 16 to 35 mm<sup>2</sup> the cross-section of the protective conductor must be at least 16 mm<sup>2</sup>.
- If the cross-section of cores L1, L2 and L3 of the mains supply line is > 35 mm<sup>2</sup>, the cross-section of the protective conductor must be at least half the cross-section of L1, L2, L3.
- Two M10 threaded bolts are available on the ZAdyn4Bplus to connect the protective conductors (see fig.).



## 5.5 Mains connection



### Danger!

Before connecting to the mains, check if the technical data on the rating plate of the ZAdyn4Bplus corresponds to the required connection values.

### 5.5.1 Network form

The line filter and ZAdyn4Bplus are designed for use in an earthed power supply system. Permissible network forms are:

- TN network
- TT network



### Information

The line filter and ZAdyn4Bplus are unsuitable for use in the IT network!

### 5.5.2 Cable cross section

The line cross-section must be specified dependent on the motor's rated current and the ambient conditions (e.g. temperature, wiring method) in accordance with DIN VDE 0100.

### 5.5.3 Mains fuse

The size of the mains fuse must reflect the cable cross-section used and the ambient conditions.

Use the following maximum fuse sizes, depending on the frame size of the ZAdyn4Bplus:

ZAdyn frame size	Max. fuse for operating class gG
ZAdyn4Bplus 110	125 A
ZAdyn4Bplus 150	160 A
ZAdyn4Bplus 180	200 A
ZAdyn4Bplus 220	200 A

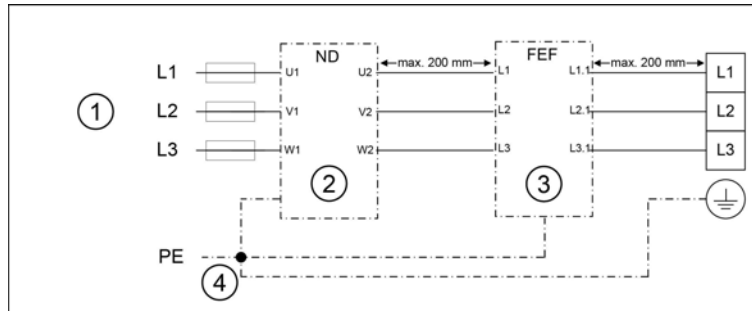


**5.5.4 Type of cable**

Use flexible cables with ring cable lugs. The power line does not have to be shielded.

**5.5.5 Connection**

The mains connection is based on studs with a diameter of 12 mm. To prevent damage to the cables and the connecting screws and to ensure good contact, the screws must be tightened to the torque stated in the technical data.



ZAdyn4Bplus mains connection  
 1 Mains 3~ 400V/PE/50Hz  
 2 Line reactor ND  
 3 Radio interference filter FEF  
 4 Central ground point

**5.6 Line reactor-radio interference filter**

Installation in the mains feed to comply with:

- EN 12015 Electromagnetic compatibility - Product family standard for lifts, escalators and moving walks - Emission
- EN 12016 Product family standard for lifts, escalators and moving walks - Immunity

**CAUTION!**

When the frequency inverter is operated without a power choke, the harmonic limit values quoted in product family standard EN12015 are not met. The service life of the device is also considerably shorter.

The line reactor and the radio interference filter are two separate components which have to be mounted in the switch cabinet.

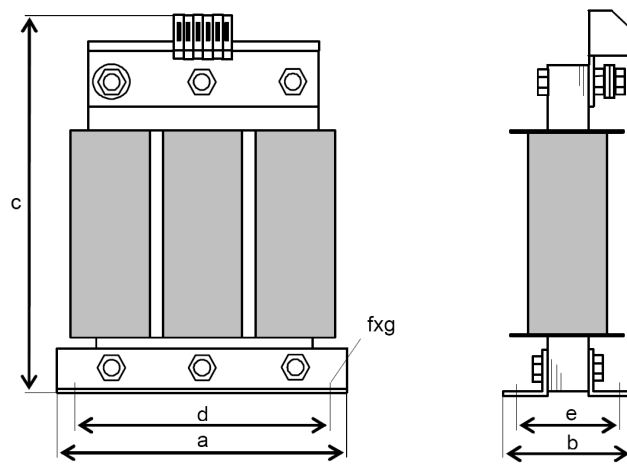
Compliance with standards and guidelines is achieved with the proper setup and the power choke and radio interference filter from ZIEHL-ABEGG.

Connection diagrams showing the connection of the line reactor and the radio interference filter can be found in the chapter "Electrical installation / line connection (X1)".

**5.6.1 Allocation of the line reactor-radio interference filter to the frequency inverter**

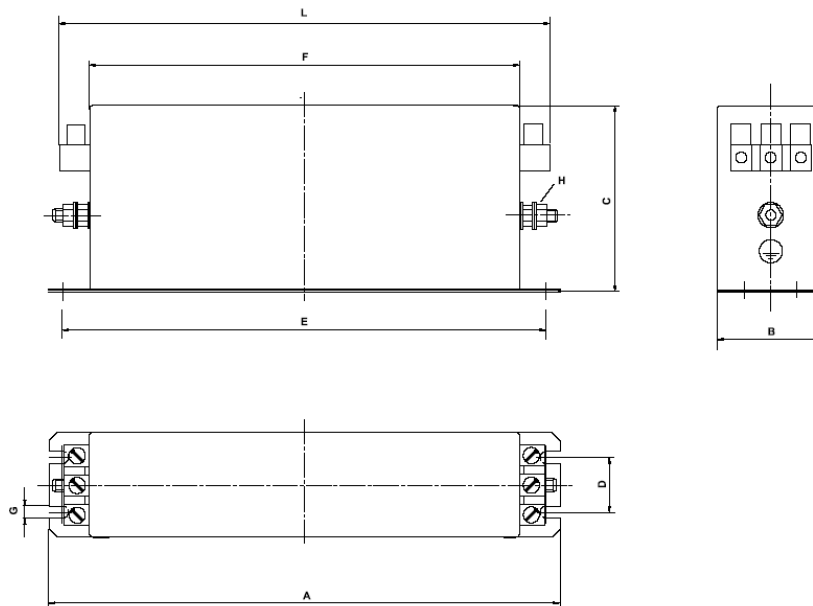
Inverter	Line reactor	Part no.	Radio interference filter	Part no.
ZAdyn4Bplus 110	ND110	357196	FEF180KK4D	357199
ZAdyn4Bplus 150	ND150	357326	FEF180KK4D	357199
ZAdyn4Bplus 180	ND180	357197	FEF180KK4D	357199
ZAdyn4Bplus 220	ND220	357327	FEF220KK4D	357328

### 5.6.2 Dimensions



ND line reactor dimensions

	Dimensions [mm]					
	a	b	c	d	e	fxg
ND110	230	150	280	180	120	8x12
ND150	230	150	293	180	122	9x12
ND180	230	150	305	180	122	9x12
ND220	240	150	297	190	125	11x15



Dimensions radio interference filter FEF

	Dimensions [mm]								
	A	B	C	D	E	F	G	H	L
FEF180KK4D	380	130	180	102	365	350	6.5	M10	450
FEF220KK4D	380	130	180	102	365	350	6.5	M10	450

### 5.7 Residual current operated device (RCCB)

Frequency inverters of the ZAdyn type require no RCCB circuit breaker for operation. The circuit at the ZAdyn4Bplus output is monitored by electronic short-circuit protection. On detecting a short-circuit current at the output of the ZAdyn (and thus negligible impedance between the phase and a body or the protective conductor of the circuit, or a protective conductor of the operating medium in the case of an error) the output current is switched off within a time of <math><20 \mu\text{s}</math>. Assuming that the potential equalisation for the ZAdyn and the motor complies with the applicable standards (VDE0100-Part 540 and DIN EN 50178), this behaviour is sufficient for the automatic switch off in case of a fault stipulated by VDE 0100-4100. If an RCCB circuit breaker is required for special reasons (e.g. fire prevention), an all-current-sensitive RCCB circuit breaker type B must be used. For maximum operational reliability, ZIEHL-ABEGG recommends the use of an RCCB circuit breaker with a reference fault current of 300 mA for fire prevention according to regulation VdS 3501.



**Information**

Please note that even when using a correct type B RCCB, false triggering due to high protective earth currents (stray current) can still occur and that operation with these protective devices is not possible.

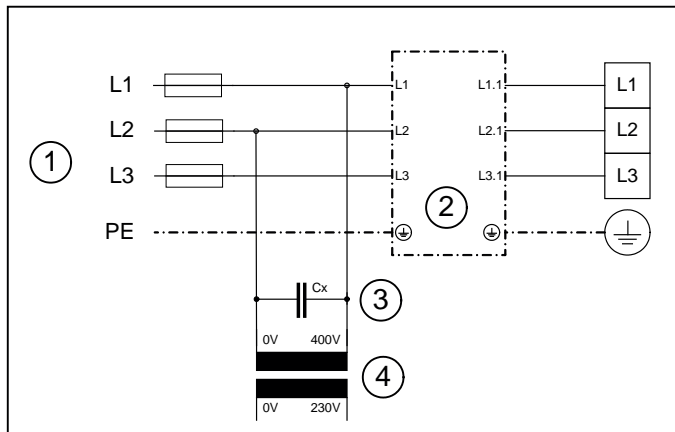
### 5.8 Control transformer in the mains supply line

**CAUTION!**

**Caution!**

When using a control transformer in the mains supply line of the ZAdyn4Bplus, you must connect a capacitor parallel to the transformer's primary winding (see Fig.).

The capacitor is used to prevent an extreme increase in voltage in case the voltage fails in one of the phases to which the transformer is connected. This voltage increase can lead to destruction of the line filter. The cause of voltage increases is resonance of the control transformer with the radio-interference suppression components, which are always used in frequency inverters.



Control transformer in the mains feed line  
 1 Mains 3~ 400V/PE/50Hz  
 2 Line reactor-radio interference filter  
 3 Capacitor  
 4 Control transformer

**Recommended capacitor types for Cx:**

- Epcos Typ B2583210μF/640V-AV
- Capacitors for motor start-up with the following data: 10 μF/450 VAC

**In addition, you must comply with the following:**

- During sequential disconnection, switch off the phase on which the transformer is operated last
- Do not oversize the transformer
- If a loaded and an intermittently unloaded transformer is operated in the open loop control, operate these on the same phases

## 5.9 Motor connection

### 5.9.1 Cable cross section

The line cross-section must be specified dependent on the motor's current and the ambient conditions (e.g. temperature, wiring method) in accordance with DIN VDE 0298-4.

### 5.9.2 Type of cable

Always use screened cables for the motor connection. Both rigid and flexible cables can be used.  
Ring cable lugs must be used.  
Rated voltage  $U_0 / U$ : 450 / 750 VAC

### 5.9.3 Cable length

The maximum cable length is 25 m. With a motor line  $> 25$  m compliance with DIN EN 12015 (Electromagnetic Compatibility - Interference emissions) and DIN EN 12016 (Electromagnetic Compatibility - Interference immunity) can no longer be guaranteed.

### 5.9.4 Connection

The motor connection has M12 screws for the ring cable lugs. To prevent damage to the cables and the connecting screws and to ensure good contact, the screws must be tightened with the torque as stated in the technical data.

### 5.9.5 Contacting the shielding in the switch cabinet

The screening must be connected to the earth potential on the switch cabinet side (see "Electrical installation/motor cable, brake resistor cable" chapter).

### 5.9.6 Contacting the shielding on the motor

The screening must be connected in accordance with the operating instructions for the motor used.

### 5.9.7 Electronic short-circuit



If emergency evacuation is performed by opening the brakes, the motor windings are short-circuited by a self-activating electronic short-circuit to prevent uncontrolled acceleration of the lift. The short-circuit generates a speed-dependent brake torque which is sufficient in most cases to limit the lift speed to a safe value.



#### Information



- The electronic short-circuit is also active when there is no operating voltage on the ZAdyn4Bplus.
- If a ZAdyn4CS with an integrated electronic short-circuit is switched to an asynchronous motor, the electronic short-circuit can no longer be triggered.
- The electronic short-circuit must be deactivated when checking the weight balancing by opening the brakes.
- Please contact Ziehl-Abegg if you want to switch off the electronic short-circuit.

#### CAUTION!

When operating synchronous motors from other manufacturers, make sure that they can be operated with the electronic short-circuit and that manual emergency evacuation with short-circuited motor windings is permissible.

### 5.10 Motor temperature monitoring (X-MT)



**Information**

The X-MT connection terminal is a standard part of the ZAdyn4Bplus frequency inverter.



**Information**

The detection of over temperature of the motor doesn't cause a drive interruption. The current drive will be completed.

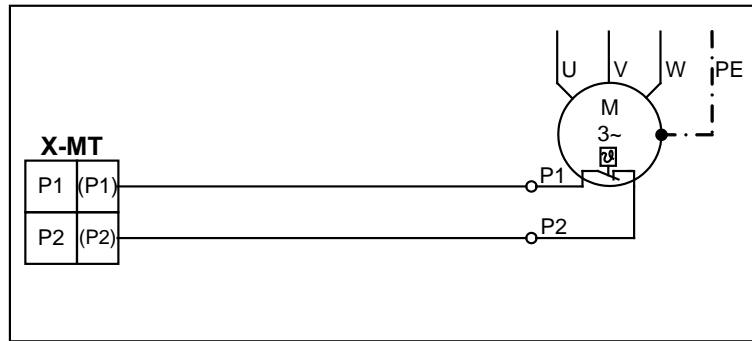
If an over temperature of the motor will be detected at stop, there is no further drive possible.

The following sensor types can be used:

- PTC thermistor (PTC in compliance with DIN 44082, switching point at 3500 Ω)
- Temperature sensor KTY84-130 (switching point adjustable: Parameter **Monitoring/R\_P1P2**)
- Thermal circuit breaker

The used sensor has to be parametrized in the menu **Monitoring/P1P2!**

```
Monitoring
↳ P1P2 PTC
  ↳ PTC
Motor-temp. monitoring
```



Temperature monitoring connection  
 () terminal designation of connector



**Information**

If you do not use the temperature monitor and install a PTC thermistor (PTC in accordance with DIN 44082) or a KTY84-130 temperature sensor, you must switch off the temperature monitor (**Monitors/P1P2=Off**). Short-circuiting of the inputs P1 and P2 is detected as an error by the ZAdyn4Bplus.

### 5.11 Brake resistor

CAUTION!

**Caution!**

An existing temperature monitor must be connected to the ZAdyn4Bplus without fail!  
 The brake resistor or the brake chopper may be burnt out in the event of a fault!

CAUTION!

**Caution!**

If the connection of a brake resistor (type BRxx) to the +DC and -DC terminals is faulty, it will emit a continuous power output and the device will become overheated. If a temperature monitor is not connected, the device will burn out!

CAUTION!

**Caution!**

The brake resistor or brake chopper used must be configured in the menu **Encoder & BC/BC\_TYP**.

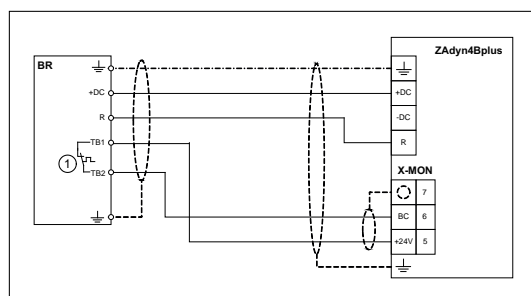
```
Encoder & BC
↳ BC_TYPE BR25
  ↳ BR25
BR/BC - Type
```

### Cable length

The maximum line length is 5 m.

When lines over >5 m are used, compliance with **DIN EN 12015** (electromagnetic compatibility – electrical interference) and **DIN EN 12016** (electromagnetic compatibility – noise immunity) is no longer guaranteed.

### Brake-Resistor connection



BR100 connection

1 Max. contact load: 5 A / 250 VAC

## 5.12 Digital inputs (X-IN)

For parallel control of the ZAdyn4Bplus, 8 digital inputs are available as standard at connection terminal X-IN. The inputs are pre-parametrised but can be assigned other functions by changing the parameters.

The inputs can be activated either galvanically isolated by an external 24 V power supply in the control system or by the internal 24 V power supply in the ZAdyn4Bplus.



#### Information

If the digital inputs are connected to the internal or external voltage supply, all inputs, i.e. also CO1, CO2, BR1, BR2, BR3, BR4 and BC are supplied by the internal or external voltage supply. The bridges +24V/+24V\_IN and GND/GND\_IN are wired on the plug at the factory so that the internal voltage supply is active.

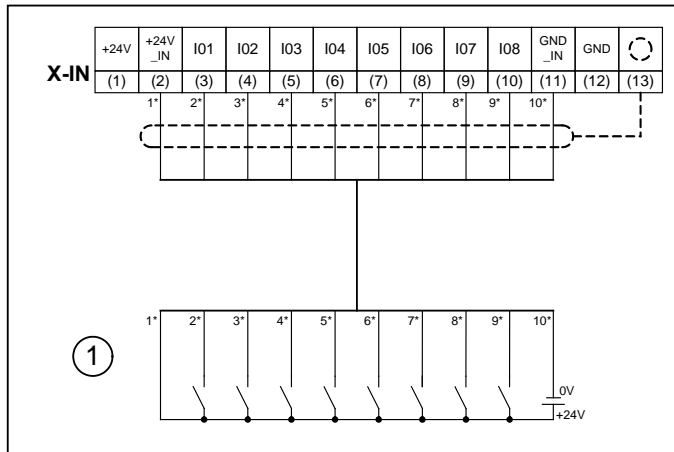
If the +24V/+24V\_IN and GND/GND\_IN terminals are not bridged, it is not possible to supply the inputs with the internal voltage supply.



#### Information

Use shielded cables for the connections. The shielding must be connected to the terminal X-IN shielding connection.

### 5.12.1 Connection with external power supply



Connection of digital input with external power supply

1 Brake Control

() terminal designation of connector

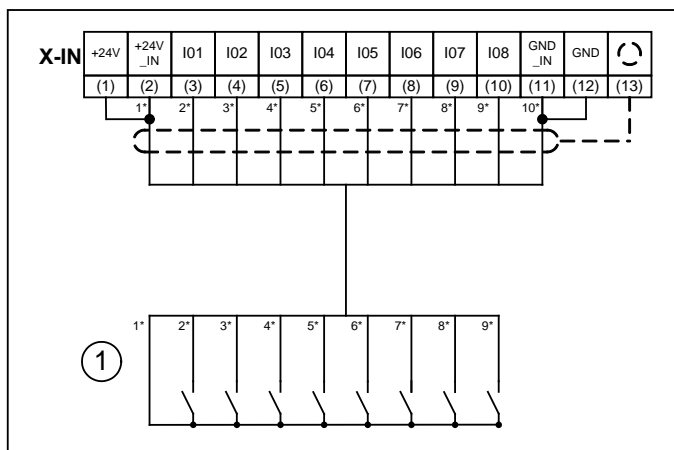
\* Wire number of the pre-assembled connecting lead X-I



#### Information

When using the external power supply the bridges between the terminals **+24V / +24V\_IN** and **GND / GND\_IN** the pre-assembled control cable X-I are not required. These must be removed!

### 5.12.2 Connection with internal power supply



Connection of digital input with internal power supply

1 Brake Control

() terminal designation of connector

\* Wire number of the pre-assembled connecting lead X-I



#### Information

When using the internal power supply a bridge must be inserted between the terminals **+24V / +24V\_IN** and between **GND / GND\_IN**. These bridges are already integrated into the pre-assembled X-I cable. The cable **GND\_IN (wire no.10)** is not required. This must be removed from the connection terminal both on the converter side and the control side and insulated.

CAUTION!

#### Caution!

The internal 24 V power supply is provided solely for the digital inputs. Switching consumer load with this voltage is prohibited!

### 5.12.3 Technical data

The digital inputs comply with the IEC61131-2 TYPE 2 industry standard.

Voltage range	+22 ... 26 VDC
Switching level low/high	<5 VDC / >11 VDC
Current consumption at 24 V	10 mA (-20%)
Clamping range	max. 1,5 mm <sup>2</sup>

### 5.12.4 Terminal assignment X-IN

You can configure the inputs I1 ... I8 assignments. The configuration can be implemented by:

- Presetting the used control system (assignment corresponding to the control requirements)
- Free configuration

Implement configuration of the digital inputs in the **Control system\CONFIG** menu.

**The input assignments dependent on the configuration:**

Configuration	Inputs							
	I01	I02	I03	I04	I05	I06	I07	I08
00:Free	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
01:ZA_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
03:BP_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
08:KN_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
11:NL_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
13:SS_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	V4
15:ZA_BIN	RF	DIR	BIN0	BIN1	BIN2	Free*	Free*	Free*
16:WL_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	V4
21:ST_IO	RF	V1	V2	V3	VZ	RV1 UP	RV2 DOWN	Free*
24:CSILVA	RF	BIN0	BIN1	BIN2	Free*	RV2 DOWN	RV1 UP	Free*
25:X_BIN	XBIN2	XBIN1	XBIN0	RV1 UP	RV2 DOWN	Free*	Free*	RF
27:MAS_BIN	RF	DIR	MBIN0	MBIN1	MBIN2	BR1	BR2	Free*
30:KS_IO	RF	V1	V4	V2	VZ	RV1 UP	RV2 DOWN	V3
31:KL_IO	V4	V1	V2	V3	VZ	RF+RV1	RF+RV2	PA-RA*2
32: S_SMART	RF	V1	LZ	V3	V4	RV1 UP	RV2 DOWN	Free*



#### Information

To be able to travel, at least the following input signals need to be present:

- Controller enable
- Speed
- Direction



### 5.12.5 Binary travelling speed default

#### Fixed binary allocation (CONFIG=15:ZA\_BIN)

travel speed	Function of input		
	BIN2	BIN1	BIN0
-	0	0	0
V1	0	0	1
V2	0	1	0
V3	0	1	1
V4	1	0	0
V5	1	0	1
V6	1	1	0
VZ	1	1	1

#### Free binary allocation (CONFIG=25:X\_BIN)

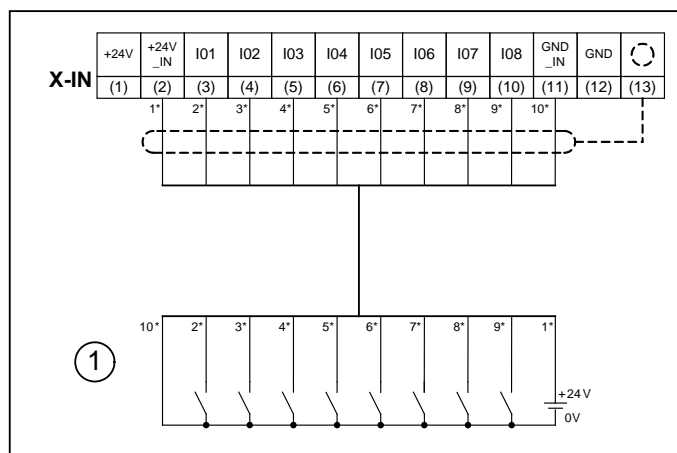
Travelling speeds can be freely allocated to the binary codes. The allocation is made using the parameters **Control system/X\_BIN1...X\_BIN7**.

Function of input			travel speed
XBIN2	XBIN1	XBIN0	
0	0	0	-
0	0	1	<b>Control system/X_BIN1</b>
0	1	0	<b>Control system/X_BIN2</b>
0	1	1	<b>Control system/X_BIN3</b>
1	0	0	<b>Control system/X_BIN4</b>
1	0	1	<b>Control system/X_BIN5</b>
1	1	0	<b>Control system/X_BIN6</b>
1	1	1	<b>Control system/X_BIN7</b>

### 5.12.6 Inverting the logic of the digital inputs

The logic of the digital inputs can be inverted. This requires the jumper J4 to be reconnected.

#### 5.12.6.1 Connecting to external power supply with inverted logic



Connecting digital inputs to external power supply with inverted logic

1 Brake Control

() terminal designation of connector

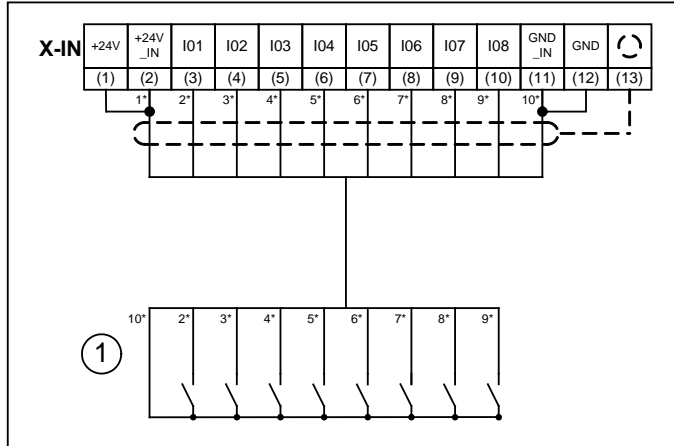
\* Wire number of the pre-assembled connecting lead X-I



**Information**

When using the external power supply the bridges between the terminals **+24V / +24V\_IN** and **GND / GND\_IN** the pre-assembled control cable X-I are not required. These must be removed!

**5.12.6.2 Connecting to internal power supply with inverted logic**



Connection of digital input with internal power supply

1 Brake Control

() terminal designation of connector

\* Wire number of the pre-assembled connecting lead X-I



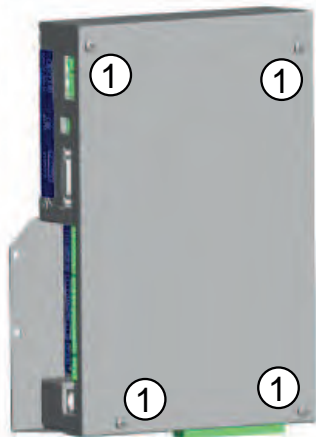
**Information**

When using the internal power supply a bridge must be inserted between the terminals **+24V / +24V\_IN** and between **GND / GND\_IN**. These bridges are already integrated into the pre-assembled X-I cable. The cable **24V\_IN (wire-No.1)** is not required. This must be removed from the connection terminal both on the converter side and the control side and insulated.

**5.12.6.3 Reconnecting the jumper J4**

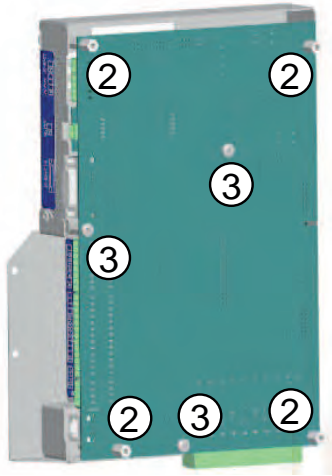
The jumper J4 on the CU board must be reconnected to invert the logic of the digital inputs.

▷ Unscrew fastening screws (1) on the cover of the controller unit.



Controller unit

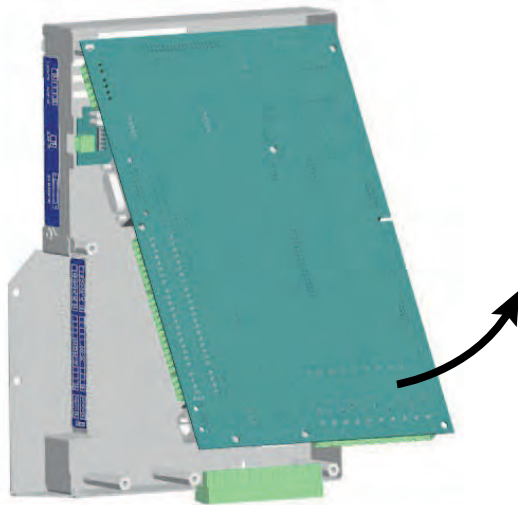
- ▷ Remove the cover.
- ▷ Unscrew bolts (2) and fastening screws (3) on the CU board.



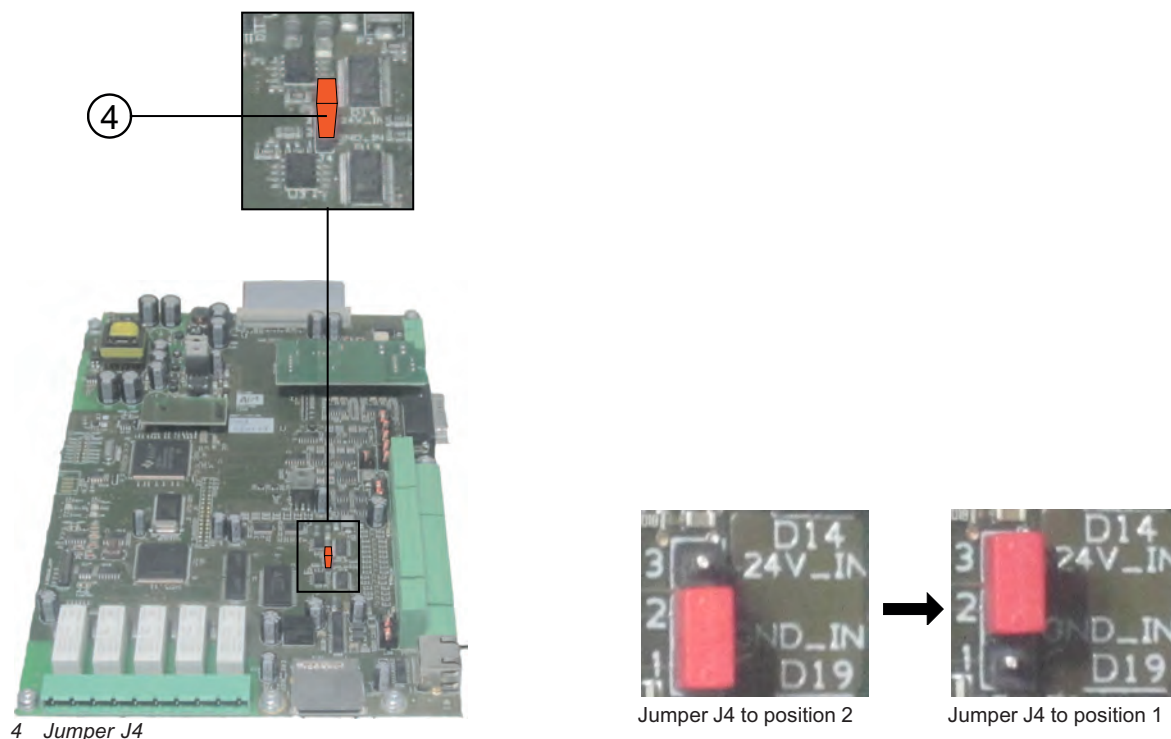
CU board

The CU board is attached by the ribbon cable at the top edge on the ZAdyn4Bplus.

- ▷ Pivot the CU board upwards.



- ▷ Connect the red jumper J4 (4) on the CU board from position 2 (pins 1 and 2) to position 1 (pins 2 and 3).



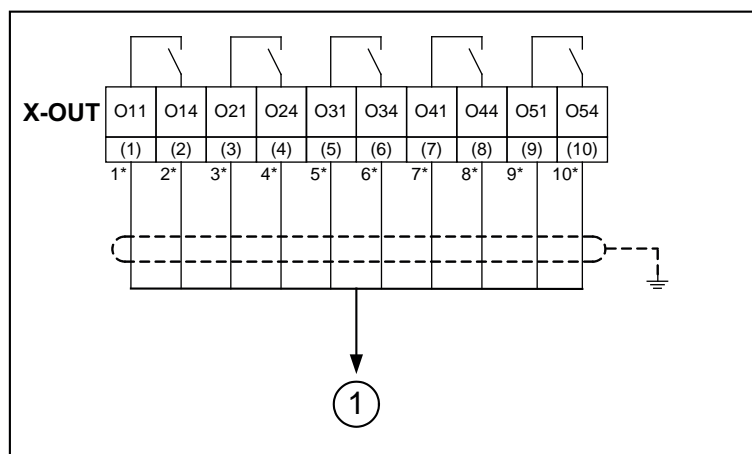
- ▷ Follow the steps in reverse to assemble the board and the cover.

### 5.13 Digital outputs (X-OUT)

#### 5.13.1 Digital outputs X-OUT

The connection terminal X-OUT is equipped with 5 digital outputs as zero potential relay contacts with normally open function. The functions of the outputs are pre-parameterised but can be assigned other functions by changing the parameters.

##### 5.13.1.1 Connection X-OUT



Connection of the digital outputs X-OUT

1 Brake Control

() terminal designation of connector

\* Wire number of the pre-assembled connecting lead X-O

### 5.13.2 Technical data X-OUT

Short-circuit-proof	no*
Min. switching capacity	5 mA / 12 VDC
Max. switching capacity	2 A / 250 VAC
Cable cross section	max. 2,5 mm <sup>2</sup>

CAUTION!

#### Caution!

\* In order to protect the relay contacts, switched inductivities must be provided with an external suppressor circuit (suppressor diode, RC element).

### 5.13.3 Terminal assignment X-OUT

The output assignments can be configured. The configuration can be implemented by:

- Presetting the used control system (assignment corresponding to the control requirements)
- Free configuration

Implement configuration of the digital outputs in the **Control system\CONFIG** menu.

Please refer to the "Parameter list/Control menu" chapter for a description of the individual parameters

#### The output assignments dependent on the configuration:

Configuration	Outputs				
	O11 - O14	O21 - O24	O31 - O34	O41 - O44	O51 - O54
00:Free	Fault	MB_Brake	RB	V < V_G1	STO-Info
01:ZA_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
03:BP_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
08:KN_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
11:NL_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
13:SS_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
15:ZA_BIN	Fault	MB_Brake	RB	V < V_G1	STO-Info
16:WL_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
21:ST_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
24:CSILVA	Fault	MB_Brake	RB	V < V_G1	STO-Info
25:X_BIN	RB	MB_Brake	V=O	Fault	STO-Info
27:MAS_BIN	Fault	MB_Brake	RB	Off*	STO-Info
30:KS_IO	Fault	MB_Brake	RB	V < V_G1	STO-Info
31:KL_IO	Fault	MB_Brake	RB	Evac.Dir.	STO-Info
32: S SMART	Fault	MB_Brake	RB	SD	STO-Info

### 5.14 DCP / CAN interface (X-DCP, X-CAN)

As an alternative to the conventional wiring, it is possible to control the ZAdyn4Bplus via DCP or CANopen lift (see chapter "Serial communication").

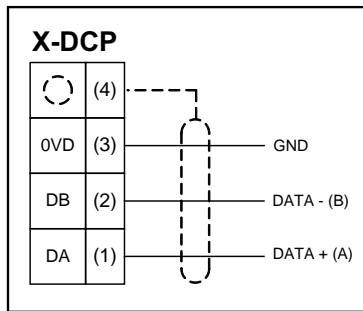


#### Information

The X-DCP and X-CAN connection terminals are standard parts of the ZAdyn4Bplus.

#### 5.14.1 DCP

- Use a shielded cable for the connection. The shielding must be grounded on the inverter side.
- Configure the connection between the ZAdyn4Bplus and the control system without additional terminal points.
- The maximum line length is 50 m.



DCP connection  
 () terminal designation of connector

☞ For more detailed information on DCP, see chapter "Serial communication/DCP (Drive Control & Position)"

#### 5.14.2 CANopenLift

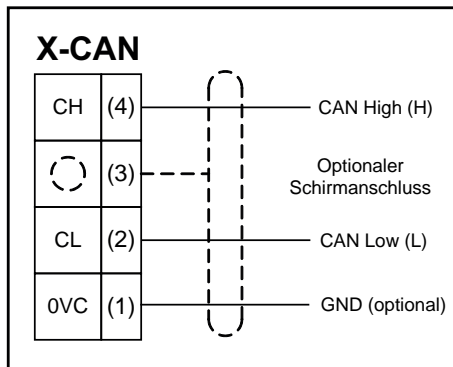
- A shielded bus-cable is not needed, but the data wires should be twisted.
- The wiring is in a linear structure. The individual devices are connected to the main line with short stub lines.
- The bus should be terminated with a terminating resistor of 120 - 150 Ohms, at both ends of the bus.
- The maximum length of the bus is 200 m and 6 m at the branch lines.

**CAUTION!**

#### Caution!

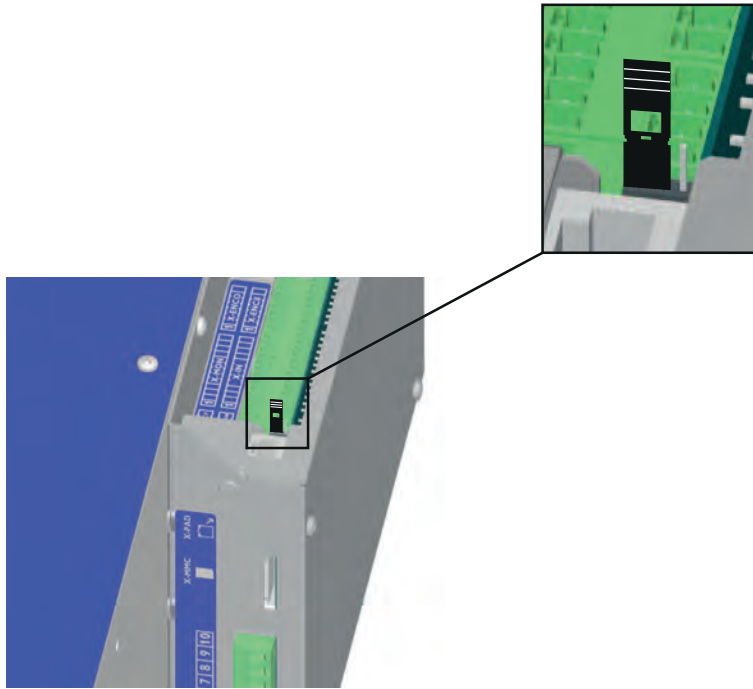
Incorrectly wired connections can destroy the electrical/electronic components. Electrostatic discharges can be hazardous to the electronic components and lead to errors in the software.

The bus line is connected via the X-CAN interface of the ZAdyn4Bplus



Connection CAN

To activate the terminating resistance, the jumper at terminal J1 must be plugged into the left two pins (see fig.).



Jumper on the left two pins

👉 For more detailed information on CANopen lift, see chapter "Serial communication/CANopen lift"

### 5.15 STO interface (X-STO)

The following points must be observed when switching and wiring the STO signals:

- Separate relays must be used for every input for switching the STO signals (two-channel activation).
- When wiring the STO signals, short-circuits and external shorts must be ruled out on power lines and terminal points because the internal diagnostics of the ZAdyn4Bplus does not detect any short-circuits on the power lines:
  - Outside the switch cabinet, the STO line must be permanently laid (fixed) and protected against external damage (e.g. cable duct, armoured tube or similar). If separate jacketed cables are used for the STO\_A and STO\_B signals, the cables must not be laid with protection (according to ISO 13849-2).
  - Air and creep distances of at least 2 mm must be kept between the STO\_A, STO\_B and +24V\_STO signals according to EN 81 (e.g. at terminal points).
  - Terminals which comply with a CENELEC or IEC standard must be used.
  - The wiring technique must be compliant with DIN EN 60204-1.
- External shorts must be ruled out in the exciter voltage of the relays that actuate the STO inputs (end of the safety chain).
- Supply cables (power cable, motor cable) and STO cables must be laid separately.
- The maximum line length is 50 m.
- Use shielded lines.

The relays used to activate the STO inputs must meet the following requirements:

- Safe disconnection between coil and contacts according to EN 60664-1 or equivalent standard.
- Rating according to the technical data of the STO inputs (typ. 24 V/12 mA). It is recommended to use relays with hard gold-plated contacts.
- Switching voltage min. 60 VDC
- When selecting the relay, ensure sufficient interference immunity to interference voltages on the control side (coil), such as for capacitive couplings in long control cables. If in doubt, use a relay with increased drop voltages (such as Phoenix Contact series PLC-...SO46, Finder series 38.51.3 or comparable).



**Danger!**

If you use an external voltage source instead of the internally generated 24-V voltage (X-STO: +24V\_STO) to actuate the STO inputs, you must use a voltage source with low voltage and safe electrical disconnection (SELV/PELV).

See the chapter "Safe Torque Off(STO) function" for further information.

#### 5.15.1 Terminal assignment X-STO

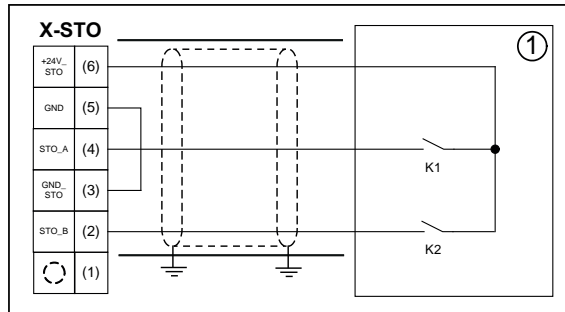
no.	Designation	Function
6	+24V_STO	24VDC output voltage (to be used only for activation of the STO inputs, do not connect any additional loads)
5	GND	Reference potential 24VDC output voltage
4	STO_A	Input STO A
3	GND_STO	Reference potential, inputs STO_A/B
2	STO_B	Input STO_B
1		Shielding



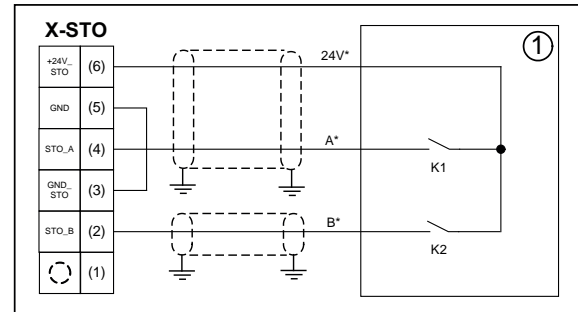
### 5.15.2 Technical data X-STO

Voltage range	0...30 VDC
Switching level LOW / HIGH	0 V < LOW < 3 VDC 15 V < HIGH < 30 VDC, typical: 24 VDC
Current consumption at 24 VDC	typ. 12 mA per input
Connection terminal range	min. 0.25 mm <sup>2</sup> ...max. 2.5 mm <sup>2</sup>

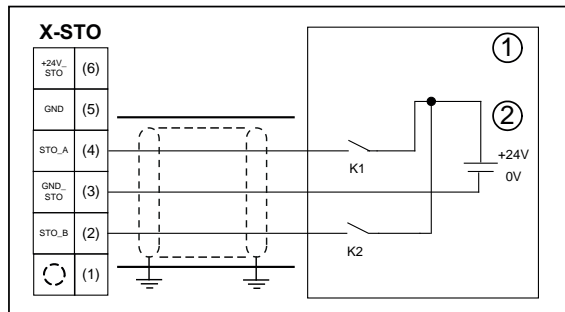
### 5.15.3 X-STO connection



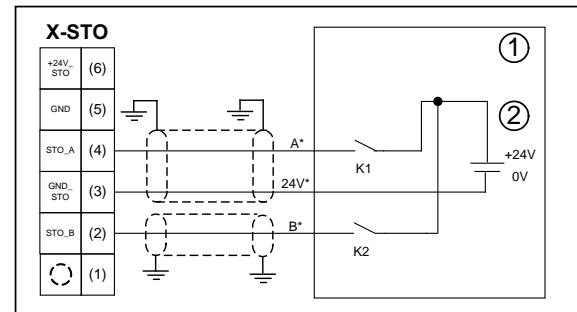
Connection with internal 24 V voltage and protected routing  
1 Brake Control



Connection with internal 24 V voltage using two separate jacketed cables  
1 Brake Control  
\* Wire designation of the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO



Connection with external 24 V voltage and protected routing  
1 Brake Control  
2 External voltage source SELV/PELV



Connection with external 24 V voltage using two separate jacketed cables  
1 Brake Control  
2 External voltage source SELV/PELV  
\* Wire designation of the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO



#### Information

When using an external 24 V voltage source and the pre-assembled connecting leads L-SL-xx-HX-ZA4-STO, the plug pin allocation must be adapted according to the figure. In this case, remove the 24V marking on the wire because this is now used for the ground connection.

### 5.16 Rotary encoder connection for asynchronous motors (X-ENC8, X-ENC15)

**X-ENC8:** 8-pole terminal strip for connection with single wires

**X-ENC15:** 15-pole SUB-D jack for connection with Sub-D plug



**Information**

At the X-ENC 15 connection, both incremental encoders for asynchronous motors and absolute encoders for synchronous motors can be connected.



**Information**

- Use a shielded cable for the connection.
- Attach the shielding on the frequency inverter corresponding to the terminal or pin assignments.
- Configure the connection between the ZAdyn4Bplus and the rotary encoder without additional terminal points

CAUTION!

**Caution!**

The pin assignment of the SUB-D socket X-ENC15 is not standardised. When using encoders from other manufacturers, make sure that these have the same contact assignment and an interface with identical specification.

CAUTION!

**Caution!**

Before the rotary encoder is plugged in/connected, the rotary encoder type and resolution used must be configured in the "Encoder & BC/ENC\_TYPE" and "Encoder & BC/ENC\_INC " menus.

```
Encoder & BC
↳ EN_Type TTL rect.
  ↳      TTL rect.
Encoder type
```

```
Encoder & BC
↳ ENC_Inc 2048
  ↳      2048
Encoder resolution Imp/Rev
```

#### 5.16.1 Technical data X-ENC8 X-ENC15

Encoder types	Sine encoder Incremental encoder TTL Incremental encoder HTL (only X-ENC8)
Rotary encoder resolution	64 ... 4096 pulse / revolution
Input resistor	120 Ω
Cut-off frequency	200 kHz
TTL differential frequency (against GND)	Ulow <= 0,5 V Uhigh >= 2,5 V
Sine differential signal (at 2.5 V offset against GND)	0,6 Vss ... 1,2 Vss (typ. 1Vss)
Connection	Shielded twisted pair cable
Terminal assignment X-ENC8	max. 1,5 mm <sup>2</sup>
Max. cable length	25 m

### 5.16.2 Terminal assignment X-ENC8

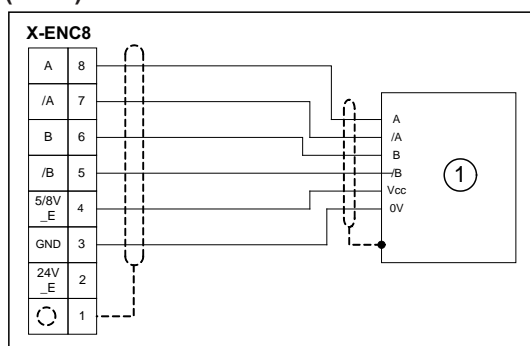
1	⊕	Shielding
2	+24V_E	+24 V power supply for HTL encoder
3	GND	Earth
4	+5/8V_E	+5 V power supply for sinus and TTL encoder
5	/B	Track B inverse
6	B	Track B
7	/A	Track A inverse
8	A	Track A

### 5.16.3 X-ENC15 pin assignment

1	-	-
2	-	-
3	-	-
4	+5 V_E	+5/8V voltage supply (power supply is switched off if the rotary encoder is missing)
5	DGND	Ground voltage supply of rotary encoder
6	-	-
7	B	Analog track B
8	-	-
9	-	-
10	-	-
11	-	-
12	A	Analog track A
13	/A	Analog track A inverse
14	/B	Analog track B inverse
15	DGND	Ground voltage supply of rotary encoder
Housing		Shielding

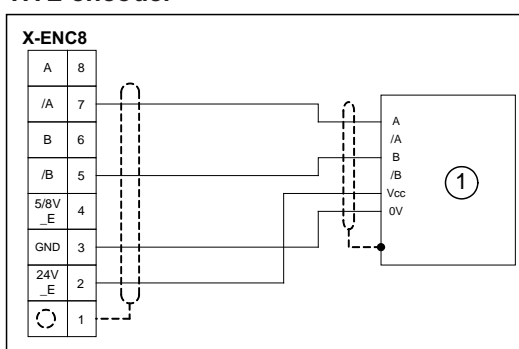
### 5.16.4 Rotary encoder connection to terminal X-ENC8

TTL incremental encoder (5V), sine encoder (1Vss)



TTL encoder (30V)  
1 TTL- or sine encoder

HTL encoder



HTL encoder connection  
1 HTL-encoder



#### Information

Pay attention to correct connection of the signal tracks when connecting HTL incremental encoders!

- signal A → input /A
- signal B → input /B

### 5.17 Rotary encoder connection for synchronous motors (X-ENC15)



**Information**

At the X-ENC 15 connection, both incremental encoders for asynchronous motors and absolute encoders for synchronous motors can be connected.

CAUTION!

**Caution!**

The pin assignment of the SUB-D-socket X-ENC15 is not standardised. When using encoders from other manufacturers, make sure that these have the same contact assignment and an interface with identical specification.

CAUTION!

**Caution!**

Before the rotary encoder is plugged in/connected, the encoder type and resolution used must be configured in the "Encoder & BC/ENC\_TYPE" and "Encoder & BC/ENC\_INC " menus.

```
Encoder & BC
↳ EN_Type EnDat/SSI
  ↳ EnDat/SSI
Encoder type
```

```
Encoder & BC
↳ ENC_Inc 2048
  ↳ 2048
Encoder resolution Imp/Rev
```

#### 5.17.1 Technical data X-ENC15

Encoder types	Absolute value encoder with EnDat, SSI, SinCos or Hiperface interface Absolute encoder ERN1387
Rotary encoder resolution	512 ... 4096 pulse / revolution
Input resistor	120 Ω
Cut-off frequency	200 kHz
Sine differential signal (at 2.5 V offset against GND)	0,6 Vss ... 1,2 Vss (typ. 1Vss)
Connection	Shielded twisted pair cable
Max. cable length	25 m

#### 5.17.2 Pin assignment X-ENC15 for absolute value encoder with EnDat, SSI, ERN1387, BISS-C and HIPERFACE interface

1	DATA	Data line for communication with the absolute encoder
2	/DATA	Data line inverse
3	/D	Analog track D inverse
4	+5 V_E	+5/8V voltage supply (power supply is switched off if the rotary encoder is missing)
5	DGND	Ground power supply absolute encoder
6	/C	Analog track C inverse
7	B	Analog track B
8	C	Analog track C for transmitting position
9	/CLK	Clock signal invers
10	CLK	Clock signal for serial transfer
11	D	Analog track D for transmitting position
12	A	Analog track A
13	/A	Analog track A inverse
14	/B	Analog track B inverse
15	DGND	Ground power supply absolute encoder
Housing		Shielding

### 5.18 Rotary encoder simulation (X-ENCO)

The rotary encoder simulation transforms the signals of the rotary encoder mounted on the motor into differential signals according to ANSI standard RS422 and transmits them to the control. The resolution of the rotary encoder simulation is identical to the resolution of the rotary encoder.



**Information**

The X-ENCO connection is not a connection for the rotary encoder but an output for transmission of data to the control. The rotary encoder is connected to the connection X-ENC8 or X-ENC15.



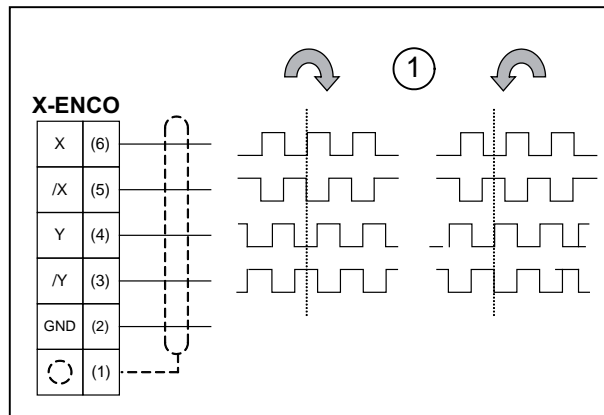
**Information**

As a result of the connection of an external 24 V voltage source to terminal X-EXT, the rotary encoder simulation is active even when the ZAdyn4Bplus is switched off.

#### 5.18.1 Technical data X-ENCO

Output signal high	min. 2,8 V / 8 mA
Output signal low	max. 0,4 V / 4 mA
Rload	≥ 120 Ω
Short-circuit-proof	No
Connection	Shielded twisted pair cable
Clamping range	max. 1.5mm <sup>2</sup>

#### 5.18.2 Connection X-ENCO



Connection of rotary encoder simulation

- 1 Signals depending on the rotating direction of the motor (with view to the power take-off side)
- () terminal designation of connector

### 5.19 External 24 V power supply (X-EXT)

By applying an external 24 V power supply to terminal X-EXT, the following functions are active even when the ZAdyn4Bplus is switched off:

- Rotary encoder simulation
- ZApad (parameter changes are possible)
- USB interface of the ZApad

#### 5.19.1 Technical data

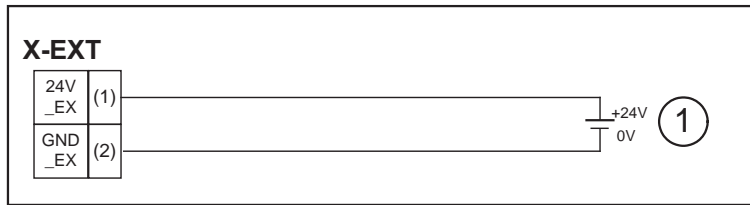
Voltage range	23 ... 26 V
Current consumption	370 mA



**Danger!**

To connect an external 24V voltage supply to X-EXT, you must use a voltage source with low voltage and safe electrical isolation (SELV/PELV).

### 5.19.2 Connection X-EXT

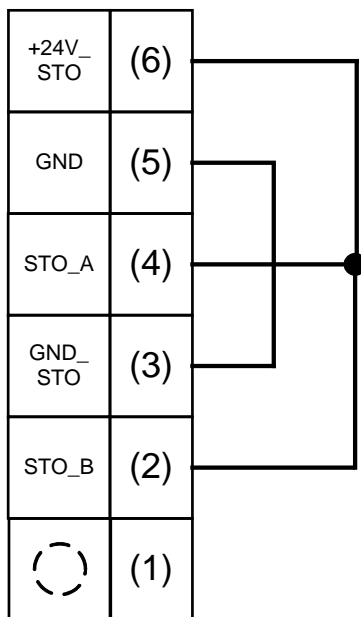


Connection external power supply  
 1 External voltage supply SELV/PELV  
 () terminal designation of connector

### 5.20 Motor contactors (optional)

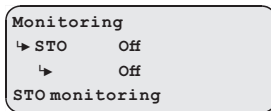
The STO connection must be bridged if motor contactors are used (see fig.).

## X-STO



STO connection bridged

The monitor of the STO function must also be deactivated.  
 The STO function is activated/deactivated in the **Monitors/STO** menu.



The motor contactors are selected depending on the motor type and the corresponding motor data.  
 The contacts of the motor contactors must be positively driven according to EN 81-1 und EN 81-20.

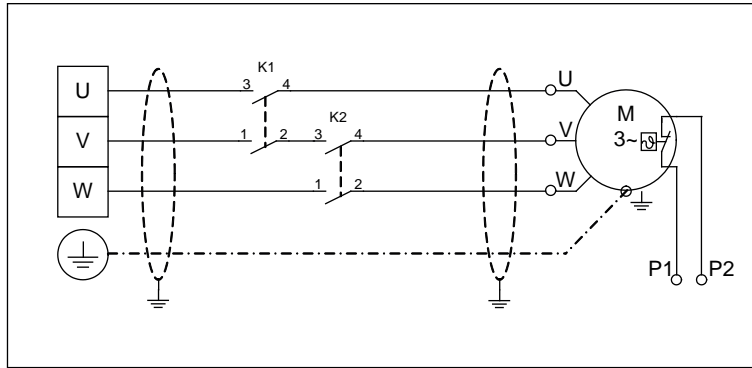
The maximum cable length to the motor contactors for non-shielded lines is **200mm**. Shielded lines must be used if there is a greater distance between the contactors and the ZAdyn4Bplus.



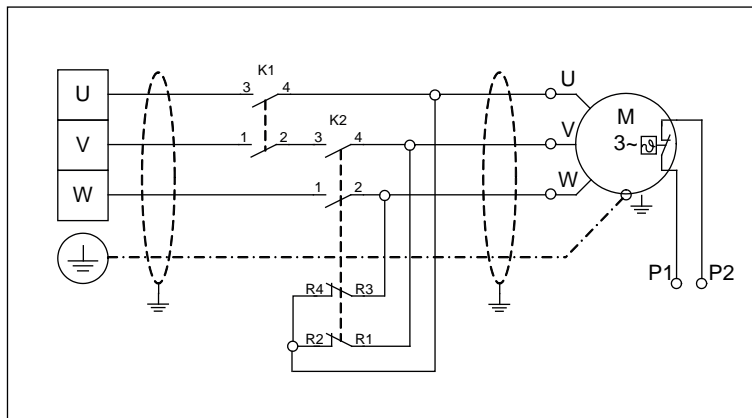
#### Danger!

When operating the motor with a rotary encoder, the line to the motor must be connected on the motor and inverter side phase-correct: U -> U / V -> V / W-> W.

Never swap the connection; not even if the rotary direction of the motor is false!! If the motor phases are swapped, motor control is generally not possible. This can lead to jerky movements or uncontrolled acceleration of the motor.



Asynchronous motor connection



Synchronous motor connection



**Information**

**S** If an emergency evacuation is carried out by opening the brakes, the motor windings should be short-circuited for the evacuation to prevent an uncontrolled acceleration of the elevator. The short-circuit generates a speed-dependent braking torque, sufficient in most cases to reduce the elevator speed to a safe level.

**CAUTION!**

If operating with synchronous motors from other manufacturers, you have to ensure that a manually emergency evacuation is approved.

**5.20.1 Monitoring of the motor contactors (X-MON)**



**Information**

The switching states of the motor contactors must be monitored according to EN 81-20. The ZAdyn4Bplus contactor monitoring does not substitute this monitoring of the motor contactors demanded in EN 81-20!

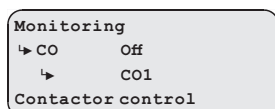
The ZAdyn4Bplus monitors the switching status of the motor contactors. The contactors must be activated during travel. Opening the contactors during travel (e.g. due to bolt bouncing) will lead to immediate interruption of the travel.

**CAUTION!**

**Caution!**

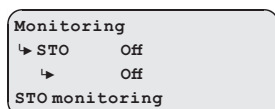
Operating gearless motors is only permissible with connected and activated contactor monitoring!

The contactor monitoring can be activated/deactivated in the **Monitoring/CO** menu.



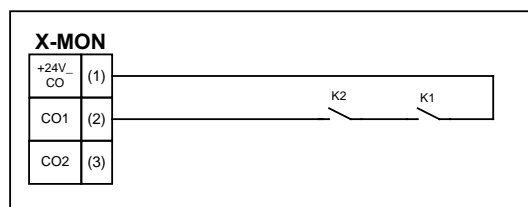
The monitor of the STO function must also be deactivated.

The monitor of the STO function is activated/deactivated in the **Monitors/STO** menu.



### 5.20.1.1 Technical data internal contactor monitoring

Monitoring voltage	+24 VDC / 8 mA
Contact type	Normally open contact (NO)
Number of inputs	2
Clamping range	max. 1,5 mm <sup>2</sup>



Connection internal contactor monitoring – series circuit  
1 Parameter "Monitoring/CO=CO1"  
( ) terminal designation of connector

CAUTION!

#### Caution!

The internal 24 V power supply is provided solely for the contactor monitoring. Switching consumer load with this voltage is prohibited!

## 5.21 Brakes

### 5.21.1 Brake release monitoring (X-BR)



#### Information

The brake release monitoring serves as monitoring for redundancy and the operation status of the brakes.

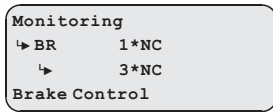
It is recommended that the brake release monitoring be connected to the ZAdyn4Bplus for optimum start-up and stopping.

When the lock function is activated, the brake release monitoring fulfils the requirements for selfmonitoring according to chapter 5.6.6 EN 81-20 for ascending car overspeed protection means and chapter 5.6.7 for protection against unintended car movement.

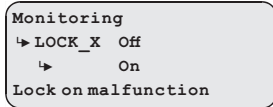
Monitoring voltage	+24 VDC / 8 mA
Contact type	Normally open contact (NO) or normally closed contact (NC)
Number of inputs	4
Clamping range	max. 1,5 mm <sup>2</sup>
Current consumption at 24 V	typ. 8 mA



The contactor monitoring can be activated/deactivated in the menu **Monitoring**.

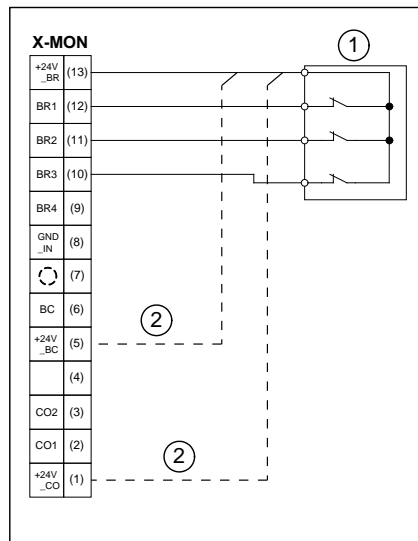


The lock function on the ZAdyn is engaged by activating the “LOCK\_X=On” parameter in the **Monitoring** menu.

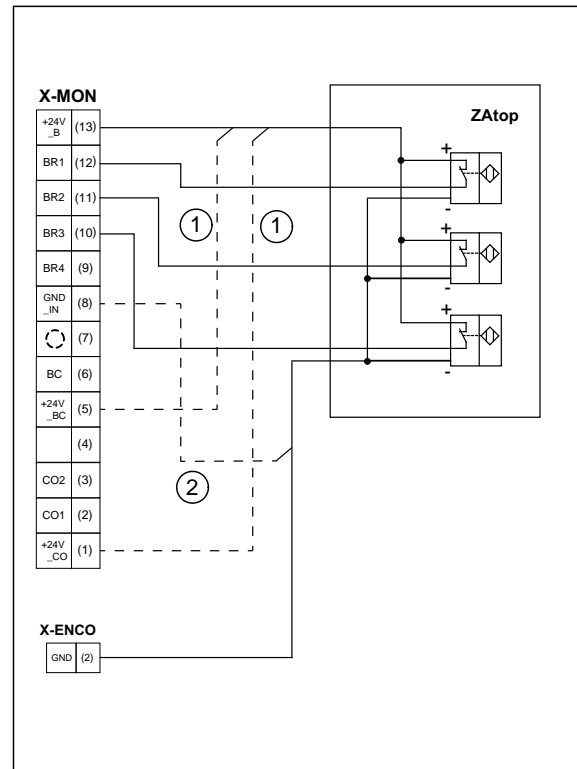


Activation of the parameter ensures that the ZAdyn locks upon detection of a faulty brake circuit. The ZAdyn lock can only be released by setting the “Monitoring / UNLOCK = On” parameter.

### 5.21.2 Connection X-BR



Connection of brake release monitor with micro switches  
1 Monitoring contacts  
2 alternative connection of 24V voltage supply  
( ) terminal designation of connector



Brake release monitoring connection with inductive proximity switches  
1 alternative connection of 24V voltage supply  
2 alternative connection of the GND  
0 terminal designation of connector

#### alternative connection of 24V voltage supply

The 24V voltage supply can alternatively be taken up at the terminals +24V\_CO (X-MON: terminal 1) and +24V\_BC (X-MON: terminal 5).

#### Alternative connection of the GND when using brake release monitoring with inductive proximity switches:

The GND can alternatively be taken up at the terminal 8 of the connection terminal X-MON.

#### Caution!

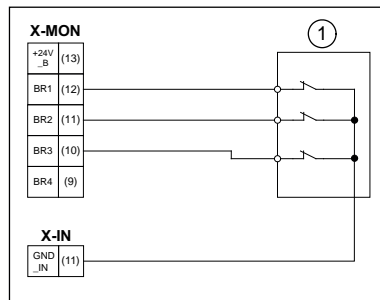
The internal 24 V power supply is provided solely for the brake release monitoring. Switching consumer load with this voltage is prohibited!

CAUTION!

### 5.21.3 Inverting the logic of the brake monitor inputs

The logic of the brake monitor inputs can be inverted. This requires the jumper J4 to be reconnected.

#### 5.21.3.1 Connecting X-BR with inverted logic



Brake release monitor connection  
 1 Monitoring contacts  
 () terminal designation of connector

#### 5.21.3.2 Reconnecting the jumper J4

Reconnect the jumper J4 as described in the chapter "Inverting the logic of the digital inputs / Reconnecting the jumper J4".

#### 5.21.4 Triggering of the brakes

The signal for controlling the brakes is provided via a zero potential digital output (see "Digital outputs"). This normally open contact can be used either by the control for further processing or directly for switching the brake contactor (see fig.).

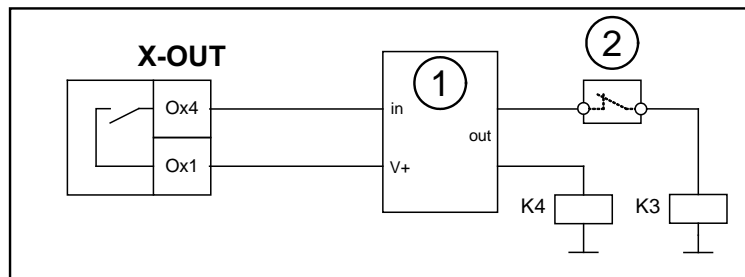


#### Information

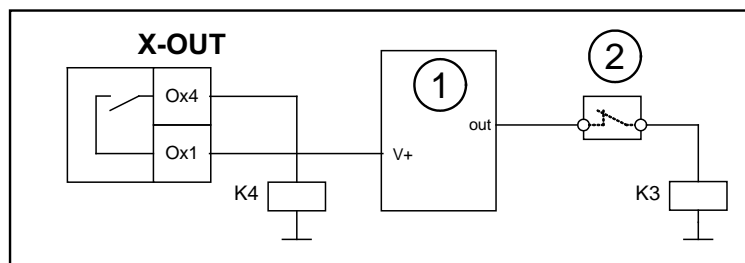
To achieve optimum travel and position behavior, the brakes must be **instantaneously** opened and closed via this contact!

To reduce noises during brake disconnect, during normal operation the brakes should be switched to the alternating current side (K4). The brakes are switched-off slower and thus quieter through the rectifier.

To ensure instantaneous brake application in emergencies, during inspection drives and return rides, use a second contactor (K3), which disconnects the brakes from the direct current side. Integrate this contactor into the safety circuit.



Activating the brakes by the control system  
 1 Brake Control  
 2 Safety circuit

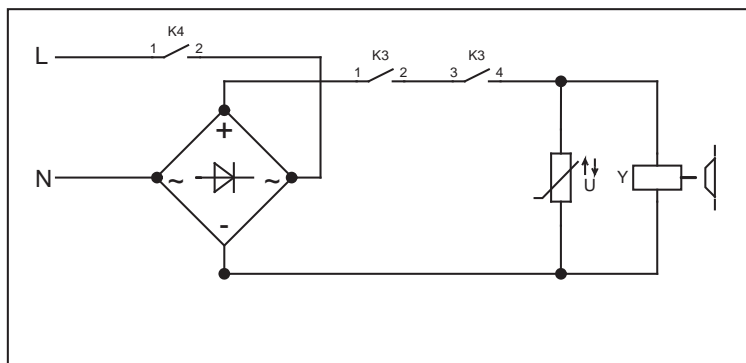


Activating the brakes via the frequency inverter and control  
 1 Brake Control  
 2 Safety circuit

**CAUTION!**

**Caution!**

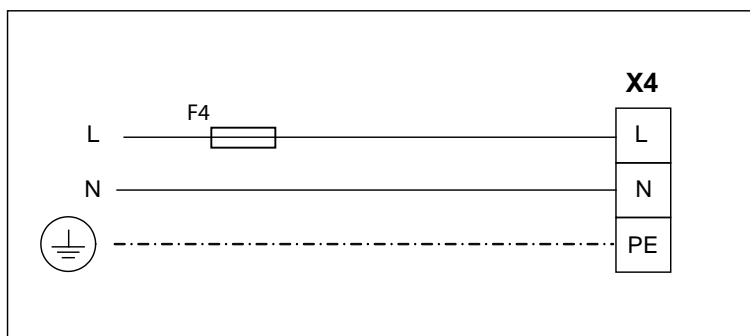
The brakes must be protected with varistors against overvoltage from switching operations. The varistor must lie directly on the coil or its connections.  
 Due to the high operating current, master contactors must be used to switch the brakes!



Brake control principle circuit diagram

The contacts from K3 must close before the contact from K4 and are only permitted to open after the contact from K4 has opened.

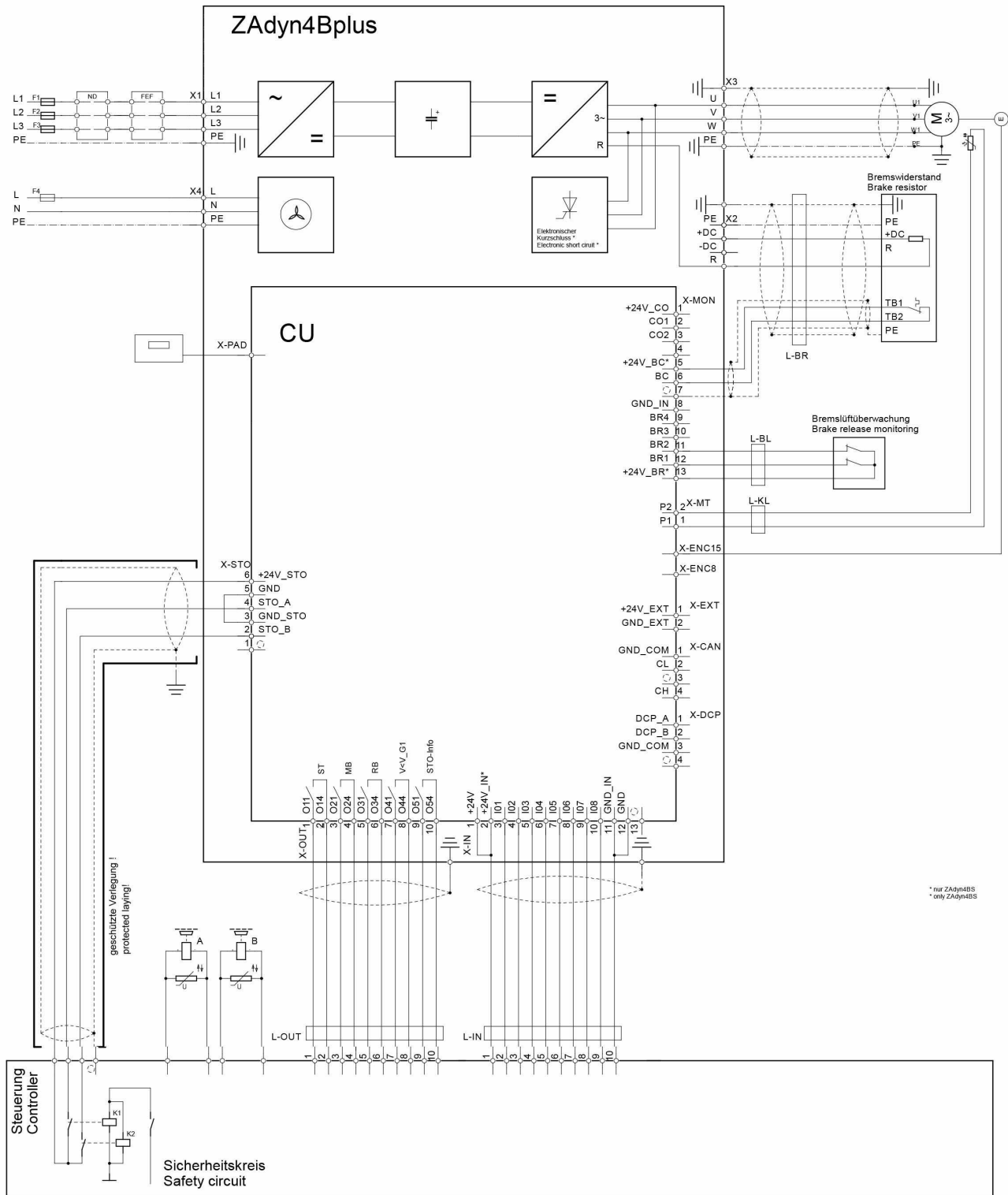
**5.22 Fan voltage supply (X4)**



Fan voltage supply

Supply voltage:	230VAC / +/-10%
Fuse (F4):	10 A Line protection switch with charakteristik B

**5.23 Circuit suggestion for ZAdyn4Bplus**



ZD4B03K1  
 Index 01, 06.12.22

## 6 Accessories

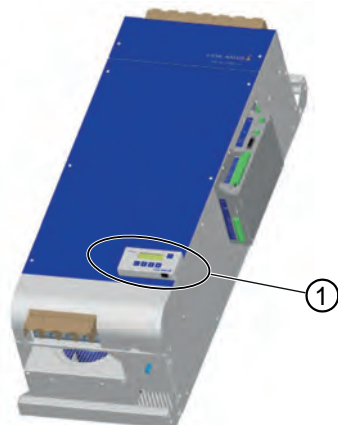
### 6.1 ZApad control terminal

The ZApad is an operating module independent of the ZAdyn4Bplus. It can be used to operate and configure all ZAdyn type frequency inverters.

Remote control of the frequency inverter is feasible when a longer connection line is used.

#### 6.1.1 Mounting / Fastening

The ZApad is secured to the housing of the ZAdyn4Bplus via magnetic strips. The magnetic strips are stuck into the three recesses on the rear of the ZApad. The magnetic strips are supplied with the ZApad.

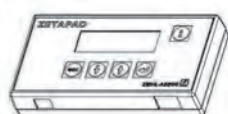
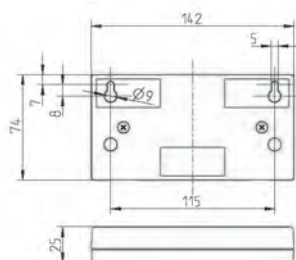


Attachment of ZApad to the ZAdyn4Bplus

1 ZApad

Two keyhole notches are available on the rear for attaching the ZApad to non-magnetic surfaces.

#### 6.1.2 Dimensions



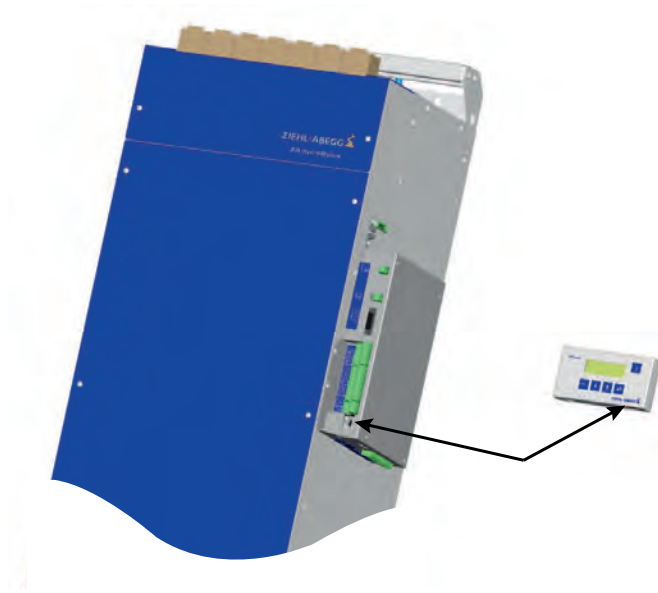
Dimensions ZApad

#### 6.1.3 Connection

The RJ-45 female plugs of the control terminal and of the ZAdyn4Bplus (X-PAD) are used for connection.

##### Connection

CAT5 network cable, 8-core  
 both sides RJ-45 plug, 8-pole  
 maximum line length: 50 m  
 line cross-section  $\geq$  AWG26



Connection of ZApad to ZAdyn4Bplus

## 7 Operation and parameterising

### 7.1 Possibilities for operation and configuration

The following operations can be performed on the ZAdyn4Bplus with the aid of the various operating facilities:

- The parameters needed for commissioning can be set
- Simple measurement and control functions can be carried out
- Service conditions can be recorded

#### 7.1.1 ZApad control terminal

The ZApad is an operating module independent from the ZAdyn4Bplus. It can be used to operate and parametrise frequency inverters of the ZAdyn4Bplus type and evacuation modules of the EVAC 3 type.

#### 7.1.2 Remote control via ZAmon software

When the ZAmon software is used, the ZAdyn4Bplus can be operated via a PC/notebook (see chapter "ZAmon software").

#### 7.1.3 Remote control via the elevator controller display

This requires an elevator control system which supports the DCP protocol or CANopen lift protocol, as well as an existing connection between the ZAdyn4Bplus and the elevator control system. Please see the elevator control system operating instructions for information on operating the frequency inverter via the elevator control system.

### 7.2 Menu navigation



#### Information

The menu navigation is designed identically for ZApad and ZAmon operating facilities! Please refer to the corresponding operating instructions for navigation with an elevator control system!








#### Information

Modifying parameters is only possible when the machine is in standstill!



Operating interface ZApad and ZAmon

### 7.2.1 Control key functions

	<ul style="list-style-type: none"> <li>• back to menu selection</li> <li>• Back to parameter selection</li> <li>• Negation of yes-no queries</li> <li>• Cancel</li> </ul>
	<ul style="list-style-type: none"> <li>• Confirming menu selection</li> <li>• Confirming parameter values</li> <li>• Confirming parameter values</li> <li>• Affirmation of yes-no queries</li> </ul>
	<ul style="list-style-type: none"> <li>• Menu selection</li> <li>• Parameter selection</li> <li>• Increasing parameter values</li> </ul>
	<ul style="list-style-type: none"> <li>• Menu selection</li> <li>• Parameter selection</li> <li>• Reducing parameter values</li> </ul>
	<ul style="list-style-type: none"> <li>• Show / exit INFO menu</li> <li>• Display of current operational states</li> </ul>

### 7.2.2 Menu and parameter navigation

<b>Main page</b>	<pre>ZIEHL-ABEGG SE DTE ZAdyn4BS 220-X S SN: 09229587/0002 Phone: +49 794016308</pre>	- Actuate with any key
<b>Menu section</b>	<pre>ZAdyn4 Main Menue -&gt;Startup Statistics Memory card</pre>	- Select required menu Confirm menu selection
<b>Parameter section</b>	<pre>Startup USR_LEV Basic -&gt;MOT_TYP SM250 n 96 rpm</pre>	Parameter selection - Confirming parameter values
<b>Changing parameter</b>	<pre>Startup ↳ MOT_TYP SM225 ↳ SM250 Motor type</pre>	- Enter / select parameter value. - Confirm value

### 7.2.3 The different operating levels

The firmware of the ZAdyn4Bplus is divided into two operating levels:

#### Basic-Level


- Three menus are available here: **Startup**, **Statistics** and **Memory Card**
- Starting up takes place exclusively in the "Startup" menu.

#### Advanced-Level

- In the Advanced-Level all parameters as described in chapter 10 "Parameter List" are displayed.
- Depending on the parameterisation, unneeded parameters are hidden automatically to give a better overview.



#### Information

- You can switch between Basic-Level and Advanced-Level by a long press of the  key.
- The **LCD & Password/USR\_LEV** sets the operator level that is active after starting the ZAdyn4Bplus.



### 7.2.4 Meaning of the arrows appearing in the display:

<pre>Motor-Typenschild -&gt; Encoder &amp; BC   Anlage-daten   Steuerung</pre>	→	Selecting a menus in the menu level
<pre>Motor-Typenschild   n      128   rpm  &gt; f     18.0  Hz   I      40.4  A</pre>	└	Selecting changeable parameters in the menu
<pre>Anlage-Daten   MOD_n* Mit D..i2     n*    94    rpm     _D   0.240 m</pre>	└└	Selected parameter can be modified, but is blocked at the moment. The block can be implemented by assigning a password or functionally (dependent on another parameter)
<pre>Start   T_2    1.0   s   T2_real 0.8   s   T_3    0.1   s</pre>	└└	Value / function of a parameters is only displayed for informational purposes and cannot be modified.
<pre>Serial-No-----01 ZAdyn4BA 110 SN: 06128238/0001 3.17-1037</pre>	<b>i</b> <b>Zahl</b>	Current position (page number) in the INFO-menue
<pre>MMC-Recorder REC_MOD On REC_CFG 0 REC_NUM 0</pre>	<input type="checkbox"/>	The recorder for recording measurements on the memory card is activ
<pre>Start   T_2    1.0   s   T2_real 0.8   s   T_3    0.1   s</pre>	<b>ERR</b>	Error of ZAdyn4Bplus The ZAdyn4Bplus must be deactivated

### 7.3 Entering numerical values

Entering numerical parameter values can be done using two different facilities:

#### 7.3.1 Continuous change of a parameter value

After selecting the parameter, the parameter value can be set by continuously changing the numerical value using the **0** & **9** key.

**Short keypress:** Number is incremented/decremented by 1

**Long push on the key:** Number automatically increases/decreases until the key is released.

```
Encoder & BC
-> ENC_INC 1024 I
  |>      2036
Encoder resolution
```

#### 7.3.2 Changing individual digits

When changing a parameter by a large value, it is possible to change the individual digits separately

After parameter selection, the desired digit can be selected with the **0** key and then changed between 0 and 9 using the **0** & **9** keys.

The selected digit is marked with an arrow.

```
Encoder & BC
-> ENC_INC 1024 I
  |>      2036
  ↑
```

## 8 Commissioning



### Danger!

Defective connections can cause the motor to start unexpectedly or lead to uncontrolled motor movements.

Reversed connections cause the motor to rotate in the wrong direction. That can cause serious machine damage.

CAUTION!

### Caution!

Incorrectly wired connections can destroy the electrical/electronic components.

Electrostatic discharges can be hazardous to the electronic components and lead to errors in the software.

You must comply with the following points to prevent machine damage or life-threatening injuries when commissioning the machine:

- Only suitably qualified personnel are to be entrusted with the commissioning of the device. They must comply with the safety instructions.
- Before starting work, make sure all tools and external parts have been removed from the machine.
- Activate all safeguards and the emergency-off switches before commissioning.
- Make sure no unauthorized persons are in the machine working area and that no other persons can be endangered when the installation is started up.
- inspect the electrical connections before the first start
- Pay special attention to the protective measures (e.g. grounding, ...) for the electrostatically endangered components.
- Also read the chapter "General Safety Instructions".



### Information


This start-up assumes the factory settings for the digital inputs and outputs, rotary encoder inputs and monitoring contacts have not been modified!

### Requirements for error-free commissioning:

- Mains line is connected
- Motor is connected
- Brake chopper or Brake resistor are connected
- Controller and monitoring inputs are connected
- Rotary encoder connected



### Information

Startup takes place in the basic level. To go to the advanced level, press the  key long (see chapter "Operation and Parameterisation / The different operating levels") or go to the **Startup** menu and set the **USR\_LEV = Advanced** parameter.

```
Startup
↳ USR_LEV Advanced
  ↳ Advanced
User Level
```

### 8.1 Switch on the ZAdyn4Bplus

When the mains voltage is applied, the ZAdyn4Bplus switches on after a self test. The following display appears:

```
ZIEHL-ABEGG SE
ZAdyn4Bplus
SN: 12345678/123
Phone: +49 794016308
```

## 8.2 Configuring the ZAdyn4Bplus

- Synchronous motors:
  - Loading parameters from the absolute encoder
  - Manual parameter setting
- Asynchronous motors: Manual parameter setting

### 8.2.1 Loading parameters from the absolute encoder



If no system data is available ("0" entered for n\* and V\*), a query appears as to whether the following parameters are to be loaded from the absolute encoder:

```
ZAdyn without parame-
parameters!
Attempt
to take data from en-
coder?
No Yes
```

- |           |           |          |           |          |           |
|-----------|-----------|----------|-----------|----------|-----------|
| • cos phi | • Q       | • P_BR   | • T_I_MAX | • V_1    | • F_PAR2  |
| • MOT_TYP | • f       | • M_MAX  | • MASK1   | • V_2    | • U_ACCU  |
| • TYP     | • G       | • CONFIG | • MASK2   | • V_I    | • P_UPS   |
| • MO_DR   | • A_POS   | • V_G1   | • MASK3   | • R_NEG1 | • R_U20   |
| • MOD_n*  | • A_NEG   | • SIM_V1 | • MASK4   | • R_NEG2 | • ENC_OFF |
| • _is     | • ENC_TYP | • STO    | • MASK5   | • T_5    | • BD_RATE |
| • _D      | • ENC_INC | • CO     | • M_START | • T_5a   | • f_I08   |
| • I1      | • BC_TYPE | • BR     | • K_START | • T_5b   |           |
| • I2      | • R_BR    | • P1P2   | • T_2     | • SPD_KP |           |
| • V_3     | • T_3     | • I_MAX  | • V_T3    | • SPD_TI |           |

"Yes": The parameters are loaded from the absolute encoder to the ZAdyn4Bplus.

"No": The ZAdyn must be manually configured as described in the chapter "Manual parameter setting on the ZAdyn4Bplus".

### 8.2.2 Manual parameter setting on the ZAdyn4Bplus

```
ZAdyn
->Startup
Statistics
Memory card
```

Select menu "Startup"



```
Startup
↳ LANG German
↳ English
Language
```

Select the "LANG" parameter  
 Choose language  
 The languages German and English are integrated as standard. A third language can be loaded with the memory card.



```
Startup
↳ USR_LEV Basic
↳ Advanced
User Level
```

Select parameter "USR\_LEV"  
 The USR\_LEV parameter can be used to set the operator level that is active after starting the ZAdyn4Bplus.



```
Startup
↳ MOT_TYP SM 200
↳ SM 200
motor
```

Select parameter "MOT\_TYP"  
 Enter the operated motor type



```
Startup
↳ n      72.0      rpm
↳       72.0
Rated speed
```

Select parameter "**n**"  
Enter the motor's rated speed



### Information

**A** With asynchronous motors, it is possible to determine the motor data automatically using the Autotune function on the ZAdyn4Bplus and to save this data in the parameter memory. See the chapter "Special functions/Autotune Function" for further information about the autotune function.



```
Startup
↳ f      18.0      Hz
↳       18.0
Rated frequency
```

Select parameter "**f**"  
Enter the motor's rated frequency



```
Startup
↳ I      13.7      A
↳       13.7
Rated current
```

Select parameter "**I**"  
Enter the motor's rated current



```
Startup
↳ U      360      V
↳       360
Rated voltage
```

Select parameter "**U**"  
Enter the motor's rated voltage



```
Startup
↳ P      5.5      kW
↳       5.5
rated power
```

Select parameter "**P**"  
Enter the motor's rated power



```
Startup
↳ cos phi 0.75
↳       0.75
Power factor
```

Select parameter "**cos phi**"  
Enter power factor of the motor  
**A** Possible only for asynchronous motors



```
Startup
↳ TYP    Star
↳       Triangle
Connection type
```

Select parameter "**TYP**"  
Choose connection type of the motor



```
Startup
↳ ENC_TYP EnDat/SSI
↳       EnDat/SSI
Encoder type
```

Select parameter "**ENC\_TYP**"  
Enter the type of encoder used



```
Startup
↳ ENC_INC 2048      INC
↳       2048
Encoder resolution
```

Select parameter "**ENC\_INC**"  
Enter the encoder resolution



```
Startup
↳ BC_TYPE BR11
  ↳ BR11
BR/BC - Type
```

Select parameter "**BC\_TYP**"  
Enter the used brake resistor or brake chopper



```
Startup
↳ v* 1.00 m/s
  ↳ 1.00
Nominal speed
```

Select parameter "**V\***"  
Enter the installation rated speed



```
Startup
↳ _D 0.315 m
  ↳ 0.400
Driving disk diam.
```

Select parameter "**\_D**"  
Enter the diameter of the traction sheave



```
Startup
↳ _is 1:1
  ↳ 1:1
Suspension
```

Select parameter "**\_is**"  
Enter the installation's type of suspension



```
Startup
↳ _i1 23.00
  ↳ 23.00
Gearbox i1:i2
```

Select parameter "**\_i1**"  
Input of i1 of the gearbox ratio i1:i2  
**A Possible only for asynchronous motors**



```
Startup
↳ _i2 1
  ↳ 1
Gearbox i1:i2
```

Select parameter "**\_i2**"  
Input of i2 of the gearbox ratio i1:i2  
**A Possible only for asynchronous motors**



```
Startup
↳ Q 600 kg
  ↳ 600
Nominal load
```

Select parameter "**Q**"  
Enter the elevator installation's rated load



```
Startup
↳ CONFIG 01: ZA_IO
  ↳ 01: ZA_IO
Configuration
```

Select parameter "**CONFIG**"  
Configuration of the digital inputs according to the used control system and type of communication



```
Startup
↳ MO_DR Left
  ↳ Left
Motor rotation direc-
tion
```

Select parameter "**MO\_DR**"  
Changing the rotating direction of the motor  
It must be observed that with triggering the input RV1 the cabin drives upwards



```
Startup
↳ BR Off
  ↳ 3*NO
Brake Control
```

Select parameter "**BR**"  
Definition of the brake monitoring



```
Startup
↳ P1P2 Off
   ↳ PTC
Motor temp. monitor
```

Select parameter "**P1P2**"  
 Motor temperature monitoring



```
Startup
↳ K_START 1.0
   ↳ 1.0
Control vers. at start
```

Select parameter "**K\_START**"  
 Amplification at start (see chapter "List of parameters/menu start-up")



```
Startup
↳ SPD_KP 1.00
   ↳ 1.00
Controller basic gain
```

Select parameter "**SPD\_KP**"  
 Multiplication factor to modify the calculated basic amplification SPD\_C

### 8.3 Automatic operating-curves default

Using the automatic operating-curve defaults, the parameters responsible for operating curves and travel speeds are pre-assigned **dependent on the "installation nominal velocity "V\*"**. As soon as the **V\*** parameter is changed, the query "Automatic travel curve assignment?" appears, and can be answered with Yes or No.

Preconfigured parameters through the automatic operating defaults:

"Acceleration" menu	"Deceleration" menu	"Travelling" menu
A_POS	A_NEG	V_2
R_POS1	R_NEG1	V_3
R_POS2	R_NEG2	

### 8.4 Testing the "Safe Torque Off" function (STO)

In the course of start-up, the "Safe Torque Off (STO)" function must be tested as a safety function test. Proceed as follows:

Test step	Result
Check the state of the two inputs STO_A and STO_B at standstill of the drive (no travel signals).	In the <b>Info menu/Start/Stop</b> , the STO_A and STO_B inputs must be marked as inactive by a small dot. A large dot must be visible next to the DIAG display.
Trigger application of a travel command, e.g. by briefly pressing the Recover UP or DOWN button.	In the <b>Info menu/Start/Stop</b> , the STO_A and STO_B inputs must be marked as active by a large dot. A large dot must be visible next to the DIAG display. <b>Attention:</b> As soon as the large dots are visible at STO_A and STO_B, remove the travel command.
At standstill of the drive (no travel signals), bridge the normally open contact of the relay for triggering the STO_A signal so that the STO_A input is activated.	In the <b>Info menu/Start/Stop</b> , the STO_A input must initially be marked as active by a large dot. A large dot must be visible next to the DIAG display. After a time of approx. 1 second, the displays for STO_A and DIAG change from a large dot to a small dot (all displays marked as inactive). The ZAdyn4Bplus triggers the "STO-Diagnostic" error (error 960).  Then remove the bridge at the relay contact again. Then reset the error by switching the line voltage off/on.
At standstill of the drive (no travel signals), bridge the normally open contact of the relay for triggering the STO_B signal so that the STO_B input is activated.	In the <b>Info menu/Start/Stop</b> , the STO_A input must initially be marked as active by a large dot. A large dot must be visible next to the DIAG display. After a time of approx. 1 second, the displays for STO_A and DIAG change from a large dot to a small dot (all displays marked as inactive). The ZAdyn4Bplus triggers the "STO-Diagnostic" error (error 960).  Then remove the bridge at the relay contact again. Then reset the error by switching the line voltage off/on.
At standstill of the drive (no travel signals), bridge both normally open contacts of the relay for triggering the STO_A/STO_B signals so that both inputs are activated.	The ZAdyn4Bplus triggers the "STO: Travel signal missing" error (error 349) after 2,5 s.  Then remove the bridge at the relay contacts again.

If one of the test steps does not achieve the described result, please contact the ZIEHL-ABEGG customer service.

The test of the STO safety function should be repeated at regular intervals (e.g. annually during routine inspections).

## 8.5 Setting the switch-off points

### 8.5.1 Interrupt points for the travel speeds V\_3 and V\_2

The deceleration paths after V\_1 or after standstill (in DCP2 and DCP4 protocol) can be read directly in the **Info menu/page 03**.

```
Dist. ----- 03
sa: 0.00 s21: 0.52m
sr:^0.00 s31: 1.45m
s1: 0 sd: 0.52m
```

s31: Display of calculated deceleration path V\_3 → V\_1  
s30: Display of calculated deceleration path V\_3 → Standstill  
s21: Display of calculated deceleration path V\_2 → V\_1  
s20: Display of calculated deceleration path V\_2 → Standstill

The following parameters influence the deceleration paths:

- V\_1 (Positioning speed)
- V\_3 (Traveling speed)
- R\_NEG1 (upper round-off)
- R\_NEG2 (lower round-off)
- A\_NEG (Deceleration)

When a parameter is changed, the newly calculated deceleration path is indicated in the display after confirming the change.

```
Travel
s31= 1.53m [ok]
```

To have some leeway to optimise the travel behaviour, the interrupt points should be set to a deceleration path larger than that which was calculated. Subsequent reduction of the creep path can be performed directly at the frequency inverter in the menus **Delay/S\_DI3** (for V\_3) and **Delay/S\_DI2** (for V\_2).

To reach almost identical positioning in all floors, the interrupt points must be set with a precision of **± 1 cm**.

### 8.5.2 Cut-off points for travel speed V\_1

To prevent overshooting the flush alignment, the interrupt points V\_1, dependent on the deceleration A\_NEG, must be set between **2 and 5 cm** before flush alignment. If the ride ends before alignment, the interrupt points need to be correspondingly adjusted. To reach almost identical positioning in all floors, the interrupt points must be set with a precision of **± 1 mm**.



## 8.6 Carrying out the first test run



### Caution!



Operating synchronous motors without encoder offset can cause uncontrolled motor movements



In synchronous motors, an encoder offset calibration must be made prior to initial travel (see chapter "Special functions/rotary encoder calibration")!

**The offset calibration has already been performed in the factory for ZIEHL-ABEGG motors.**

If third-party motors are used, the offset must be performed as described in the chapter "Special functions/rotary encoder calibration".

The first trip must be carried out with the return control or as an inspection trip.

If this trip can be carried out without any problems and without any fault messages, a normal trip can be made as the next step.

If fault messages appear, an error list is available in the "Diagnose" chapter together with the corresponding error causes

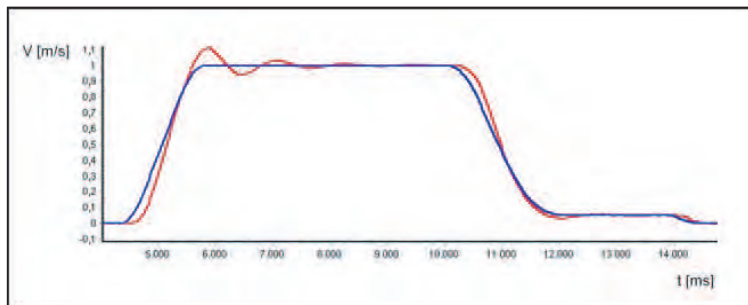
## 8.7 Optimisation of the startup and drive behaviour

The "SPD\_KP" (amplification) parameter can be used to optimise the setting of the speed controller acting during travel. The parameter can be changed in the **Control/SPD\_KP** menu.

```

Brake Control
↳ SPD_KP 1.00
↳      0.95
Base gain-factor
    
```

You can generally set the speed control by changing the factor for the basic amplification ("SPD\_KP"). If significant control deviations occur during the trip (especially during acceleration and deceleration), (see Fig.), the amplification has been set too low. In this case, increase the factor for amplification ("SPD\_KP").

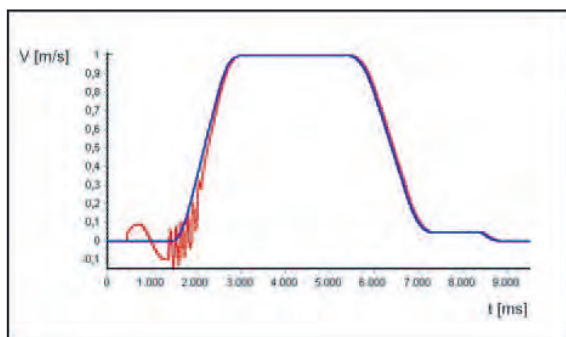


Control deviations when the amplification is set too low

blue Set-value - travel speed

red Actual-value - travel speed

If the motor is noisy or starts vibrating (see figure), amplification is set too high. In this instance, the factor for amplification ("SPD\_KP") should be reduced.



Control deviations when the amplification is set too high  
blue Set-value - travel speed  
red Actual-value - travel speed

### Optimum setting of the speed controller

The following procedure is recommended to obtain an optimum setting of the speed controller:  
Increase the parameter **Controller/SPD\_KP** until the motor causes noises/vibrations when starting up.

Decrease the parameter **Controller/SPD\_KP** until the motor causes no noises/vibrations when starting up.

### Roll back when starting up

Roll back when starting up is indicated by uncontrolled movement of the traction sheave. The reason for this is too weak a gain of the speed controller for the time at which the brake opens.

If the motor turns away when starting up despite optimum setting of the basic gain (parameter **Controller/SPD\_KP**), this can be optimised by increasing the parameter **Startup/K\_START**.

```
Commissioning
↳ K_START 1.0
↳      3.0
Start gain
```

CAUTION!

### Caution!

Before the parameter **Start-up/K\_START** is increased, it must be ensured that the basic gain (**Control/SPD\_KP**) is optimally configured!

## 9 "Safe Torque Off (STO)" function

### 9.1 General

- The "Safe torque off (STO)" function in the ZAdyn4Bplus product series corresponds to the "Safe torque off (STO)" stop function in accordance with DIN EN 61800-5-2.
- Activation of this function ensures that the ZAdyn4Bplus cannot supply any energy to the motor which can cause a torque.
- The STO function allows the contactors that are usually installed between ZAdyn4Bplus and motor in lifts to be omitted. The requirements in accordance with EN 81-20 section 5.9.2.5.4 d) or section 5.9.3.4.2 d) are fulfilled.
- The STO function must be taken into consideration in an application-specific risk analysis by the company responsible for the start-up. This company is also responsible for considering other valid safety regulations as well as the definition of the requirements for the component which control the STO function in compliance with standards.



#### Danger

There is no active braking when the STO function is activated. The drive stops gradually. This must be taken into consideration in applications in which there might be a hazard (e.g. by vertical loads). Active braking must be implemented by additional measures (e.g. by a mechanical motor brake).

### 9.2 Safety concept

- The devices of the ZAdyn4Bplus series have two safety-related inputs (two-channel structure). The drive can only generate a torque when a 24V switching signal is applied to both of these inputs. When the two 24V switching signals are switched off, the STO function is activated and the activation of the switching transistors (IGBTs) is safely prevented.
- An internal diagnostic unit constantly compares the status of the two switch-off channels (STO\_A and STO\_B). If there is an error (unequal activation or an internal hardware defect), the internal diagnostic unit triggers switch-off of the drive.
- Both inputs must be activated via two separate relays whose control voltage is supplied at the end of the electrical safety chain (see Chapter "Safe torque off (STO) function/Principle circuit diagram").



#### Information

In the version according to the principle circuit diagram, monitoring of the two relays K1/K2 by the lift control system is not necessary in order to meet the requirements of EN 81-20. The requirements are met by the internal diagnostic unit.

- If the contacts are switched differently (e.g. one of the two relays does not open), this will be detected at the STO inputs by the different signals. In this case the internal diagnostic unit will turn off safely after a max. 1600 ms. In this case, a reset is only possible by switching the device off and on again.
- The status of the STO function can be queried optionally (not safety-related) via the digital output "STO-Info".



#### Danger

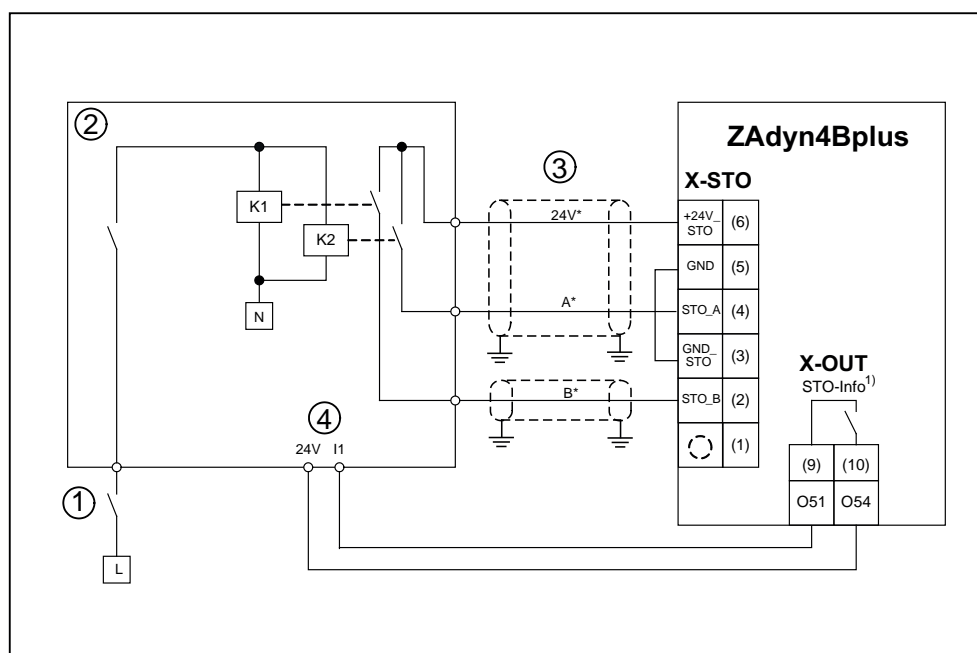
The connected motor is not separated from the ZAdyn4Bplus by activation of the STO function. Therefore, you must disconnect the ZAdyn4Bplus from the supply voltage in order to perform work on the wiring or the motor. You must wait at least 3 minutes for discharging the intermediate circuit capacitors. The safe isolation from the supply must be checked using a two-pole voltage detector.



#### Danger

If the drive is enabled again after being disabled by the STO function, the drive can restart automatically. If this is not admissible for the application, this must be implemented by external measures (restart e.g. only after confirmation).

### 9.3 Principle circuit diagram



Principle circuit diagram "Safe Torque Off (STO)" function

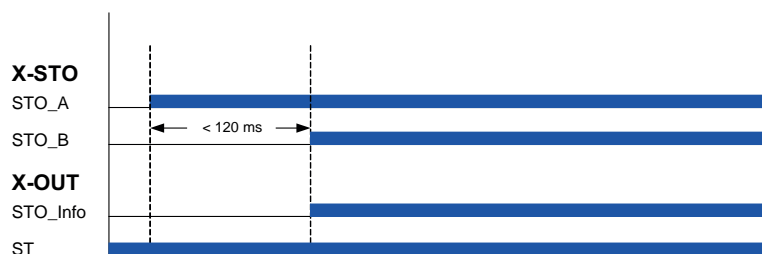
- 1 Electrical safety chain
- 2 Brake Control
- 3 Protected routing or design with two separate jacked cables (see chapter "STO interface (X-STO)")
- 4 Digital inputs control
- \* Wire designation of the pre-assembled connecting lead L-SL-xx-HX-ZA4-STO
- 1) Information only, not safety-related

### 9.4 Electrical connection

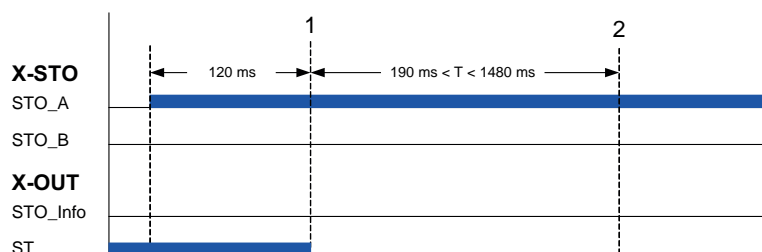
The connection is made via the interface X-STO on the ZAdyn4Bplus (see chapter "Electrical installation / STO interface (X-STO)").

### 9.5 Notes for operation

- The two STO inputs must be switched simultaneously by separate relays with every travel (two-channel activation). Removal of one of the two STO\_A or STO\_B input signals already leads to switching off of the output stage.
- When switching the STO input signals STO\_A / STO\_B, a time offset of max. 120 ms is tolerated between the signals. With a greater offset the ZAdyn4Bplus first triggers the error "STO: fault" (error 533). This gives the elevator control system the option of aborting travel.
- If the actuation fault persists, safe switch-off is effected after a further min. 190 ms and max. 1480 ms (typically 630 ms) by the internal diagnostics (error 960 "STO: diagnostics").
- An error detected by the internal diagnostic (unequal activation or internal hardware defect) leads to a locked error state. The error can only be reset after switching the line voltage off/on.



Correct activation STO  
 STO\_A safety-related input STO\_A  
 STO\_B safety-related input STO\_B  
 STO\_Info inputs STO\_A / STO\_B active – enable output stage  
 ST fault



Faulty activation STO  
 1 Error "STO: Fault"  
 2 Error "STO: Diagnostic"

The following times must be kept in operation for sufficient test coverage by the diagnostics.

- Activation STO (switch-off of STO\_A and STO\_B) at least once an hour for at least 1600 ms.

The correct activation of the STO inputs is monitored additionally (not safety-related) by the ZAdyn4B-plus for every journey:

- If the safe torque off is not cancelled (signals STO\_A, STO\_B remain LOW) at the beginning of travel after 2,5 s, the error "STO: Remains" (error 348) is triggered.
- If no safe torque off takes place (signals STO\_A, STO\_B remain HIGH) at the end of travel after 2,5 s, the error "STO: Missing" (error 532) is triggered.
- If the safe torque off is cancelled at standstill (no travel signals applied) (signals STO\_A, STO\_B become HIGH) and no travel signal is applied after 2,5 s, the error "STO: Travel signal missing" (error 349) is triggered.
- If the STO input signals are switched off during travel, the error "STO: Interruption" (error 531) is triggered after 200 ms.

During first-time start-up and the recurring tests, the function "Safe torque off (STO)" must be tested (see chapter "Start-up/testing the safety function "Safe torque off (STO)"")

### 9.6 Notes on use of motors



**Danger**

A brief aligning torque is possible in the event of an error. The motor can turn in the event of an error (defect of two or more power semiconductors) by a maximum angle  $\phi = 360^\circ/\text{number of poles}$ .

- If there is a random component error on two or more circuit breakers of the inverter, there may be a brief alignment movement by a few degrees with permanently excited synchronous machines even when the STO function is activated. A permanent field of rotation cannot be generated. The effect of the aligning torque is described below.
- The maximum possible cabin movements allowed by the alignment torque can be calculated with the following formula:

$$\text{Cabin movement [mm]} = 3.142 \times \frac{\text{driving disk diameter [mm]}}{\text{Number of poles} \times \text{suspension}}$$

Examples for possible cabin movements depending on the motor, the driving disk diameter and the suspension can be found in the following table.

#### Examples of max. car movement in mm with number of poles 14

Ø driving disk	100 mm			120 mm			160 mm			200 mm			210 mm			240 mm			320 mm			400 mm			450 mm		
Suspension	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1
Cabin movement [mm]	23	12	6	27	14	7	36	18	9	45	23	12	48	24	12	54	27	14	72	36	18	90	45	23	101	51	26

Ø driving disk	480 mm			500 mm			520 mm			600 mm			680 mm		
Suspension	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1
Cabin movement [mm]	51	26	13	113	57	29	117	59	30	135	68	34	173	77	39

#### Examples of max. car movement in mm with number of poles 20

Ø driving disk	100 mm			120 mm			160 mm			200 mm			210 mm			240 mm			320 mm			400 mm			450 mm		
Suspension	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1
Cabin movement [mm]	16	8	4	19	10	5	26	13	7	32	16	8	33	17	9	38	19	10	51	26	13	63	32	16	71	36	18

Ø driving disk	480 mm			500 mm			520 mm			600 mm			680 mm		
Suspension	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1
Cabin movement [mm]	76	38	19	79	40	20	82	41	21	95	48	24	107	54	27

**Examples of max. car movement in mm with number of poles 30**

∅ driving disk	100 mm			120 mm			160 mm			200 mm			210 mm			240 mm			320 mm			400 mm			450 mm		
Suspension	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1
Cabin movement [mm]	11	6	3	13	7	4	17	9	5	21	11	6	22	11	6	26	13	7	34	17	9	42	21	11	48	24	12

∅ driving disk	480 mm			500 mm			520 mm			600 mm			680 mm		
Suspension	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1	1:1	2:1	4:1
Cabin movement [mm]	51	26	13	53	27	14	55	28	14	63	32	16	72	36	18

The cabin movement must be taken into consideration in a risk analysis of the complete system.

**9.7 Deactivation of the STO function**



**Danger**

There is no safety-related switch-off of the output stage when the STO function is deactivated. Safety switch-off in accordance with EN 81 must then be implemented by other measures (e.g. by motor contactors), (refer to chapter "Electrical installation/Motor contactors (optional)").

**9.8 Testing the "Safe Torque Off (STO)" safety function**

In the course of start-up, the "Safe Torque Off (STO)" function must be tested as a safety function test (see chapter "Start-up/Testing the Safe Torque Off (STO) Function").

**9.9 Technical data**

Safety characteristics	
Safety function	Safe torque off (STO) according to DIN EN 61800-5-2
Safety class	SIL 3 according to DIN EN 61800-5-2 <sup>1)</sup> Meets the requirements according to DIN EN 81-1, section 12.7.3 or DIN EN 81-2, section 12.4.1 <sup>1)</sup> Meets the requirements according to DIN EN 81-20, section 5.9.2.5.4 d) or section 5.9.3.4.2 d) <sup>1)</sup>
Probability of one dangerous failure per hour (PFH)	2,69E-10 1/h <sup>2)</sup>
Mean time to dangerous failure of each channel (MTTFd)	469 years <sup>2)</sup>
Diagnostic coverage (DC)	high
Switch-off time (duration from switching off the input signals to blocking the output stage)	< 100 ms
Minimum request rate for the STO function	Once an hour for at least 1600 ms
Life cycle	20 years, then the device must be replaced by a new one
max. permissible time delay between the signals STO_A / STO_B	max. 120 ms (on exceeding this, ZAdyn4Bplus outputs an error message, see chapter "Safe Torque Off (STO) Function / Notes on Operation")

<sup>1)</sup> TÜV Rheinland conducted type examination and certification for this. Copies of the test certificates can be requested from Ziehl-Abegg.

<sup>2)</sup> assuming maximum device load for the entire life cycle

## 10 Serial communication

### 10.1 DCP (Drive Control & Position)

The DCP mode enables series control of the ZAdyn4Bplus via an RS485 interface. The two-directional series control conveys the control signals via a 2 or 3-wire connection cable. In general, the cables X-IN and X-OUT are no longer required, which reduces the wiring outlay significantly.

#### 10.1.1 Electrical connection

The connection is made via the interface X-DCP on the ZAdyn4Bplus (see chapter "Electrical Installation / DCP Interface (X-DCP)").

#### 10.1.2 The various DCP protocols

##### DCP\_01

The functional principle is identical to a conventional actuation via the control inputs (X-IN) and control outputs (X-OUT). The elevator control system transmits the required control signals (e.g. controller enable, direction of travel, speed, deceleration point) to the ZAdyn4Bplus as command bits and receives status messages in the form of status bits as return information from the ZAdyn4Bplus (e.g. signals for mechanical brakes, motor contactors, STO function, speed monitoring and general alarm).

##### DCP\_03

The DCP\_03 protocol is an expanded version of the DCP\_01 protocol. As compared with the DCP\_01 protocol, it has:

- faster data transmission
- a faster communication channel
- Automatic compatibility checking between the software in the ZAdyn4Bplus and the software in the control system

##### DCP\_02

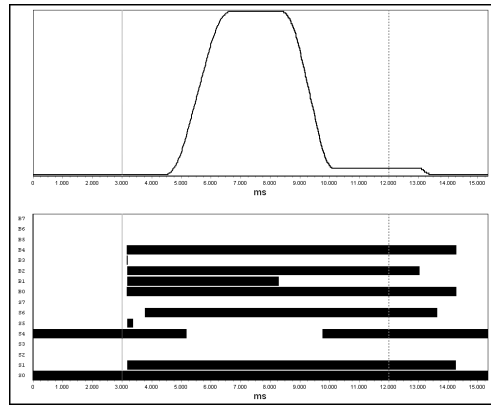
The transmission of the command and status bits is performed according to the DCP\_01 protocol. The travel is also oriented towards the remaining distance: the control uses the ZAdyn4Bplus start command to specify the path to the next level. This path is continuously updated during travel (remaining distance). The ZAdyn4Bplus adapts its travelling speed in line with the remaining distance, and the cabin travels directly into the level in a smooth and time-optimised manner without the use of creep speed. An absolute value encoder must be present in the shaft in order to specify the remaining distance! The braking distance (shown in the frequency inverter display) must be manually entered into the control prior to this. Using the braking distance entered and the current remaining distance, the control can decide during travel whether it is still possible to stop in the event that a corresponding command is received. If no command is received by the necessary delay path at the latest, then the remaining distance is extended by an additional level.

##### DCP\_04

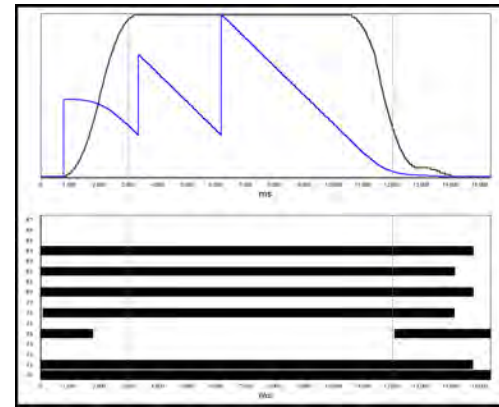
The DCP\_04 protocol is an expanded version of the DCP\_02 protocol. Compared to the DCP\_02 protocol, it has:

- faster data transmission
- a faster communication channel
- Automatic compatibility checking between the software in the ZAdyn4Bplus and the software in the control system
- a Braking distance transmission: The control unit continuously transmits the braking distance for the current speed to the open loop control. That means during an incoming call, the trip the open loop control can decide whether it is still possible to stop.





Signal curve DCP\_01, DCP\_03



Signal curve DCP\_02, DCP\_04

Command byte		Speed default byte		Status byte	
B0	Controller enable RF	G0	slow speed (V1)	S0	Frequency inverter ready for next run
B1	travel command (start)	G1	readjustment (Vz)	S1	travel active (RB)
B2	stop switch (switching off V_1)	G2	Speed 0	S2	advance warning active
B3	travel speed	G3	return (V5)	S3	general alarm active (ST)
B4	direction of travel (RV1 or RV2)	G4	Inspection (V4)	S4	speed monitoring (interface/ V_G1)
B5	speed change	G5	Additional speed (V6)	S5	fast stop
B6	transmission of rest of route	G6	interim speed	S6	mechanical brake (MB)
B7	error in the last telegram	G7	high speed (V3)	S7	error in the last telegram

The command, speed and status bytes can be read in the **Info menu / page 15**.

```

DCP-Bits ----- 15
B01..4... G...4...
s.1....6. 100
    
```

### 10.1.3 Configuring in DCP mode

#### 10.1.3.1 Activating the DCP interface

Activate the DCP interface in the **Control system/CONFIG** menu dependent on the open loop control used and the applied communication protocol.

```
Brake Control
↳ CONFIG 04:BP_DCP1
  ↳      05:BP_DCP2
Configuration
```

Manufacturer:	DCP-protocol	Abbreviation ZAdyn4Bplus
BÖHNKE + PARTNER	DCP1	04:BP_DCP1
BÖHNKE + PARTNER	DCP2	05:BP_DCP2
BÖHNKE + PARTNER	DCP3	06:BP_DCP3
BÖHNKE + PARTNER	DCP4	07:BP_DCP4
Hydraulic configuration	DCP4	36:HY-Mod.
Kollmorgen	DCP3	09:KN_DCP3
Kollmorgen	DCP4	10:KN_DCP4
NEW LIFT	DCP3	12:NL_DCP3
NEW LIFT	DCP4	37:NL_DCP4
Osma elevators	DCP3	34:OS_DCP3
SCHNEIDER STEUERUNGSTECHNIK	DCP3	14:SS_DCP3
SCHNEIDER STEUERUNGSTECHNIK	DCP4	33:SS_DCP4
STRACK LIFT AUTOMATION	DCP3	22:ST_DCP3
STRACK LIFT AUTOMATION	DCP4	23:ST_DCP4
Weber Liftechnik	DCP1	17:WL_DCP1
Weber Liftechnik	DCP2	18:WL_DCP2
Weber Liftechnik	DCP3	19:WL_DCP3
Weber Liftechnik	DCP4	20:WL_DCP4
KW AUFZUGSTECHNIK	DCP3	26:KW_DCP3

## 10.2 CANopen lift

### 10.2.1 Start-up the CAN-interface

#### 10.2.1.1 Information for start-up

CAUTION!

#### Caution

Incorrectly wired connections can destroy the electrical / electronic components. Electrostatic discharges can be hazardous to the electronic components and lead to errors in the software.

#### 10.2.1.2 ZAdyn4Bplus

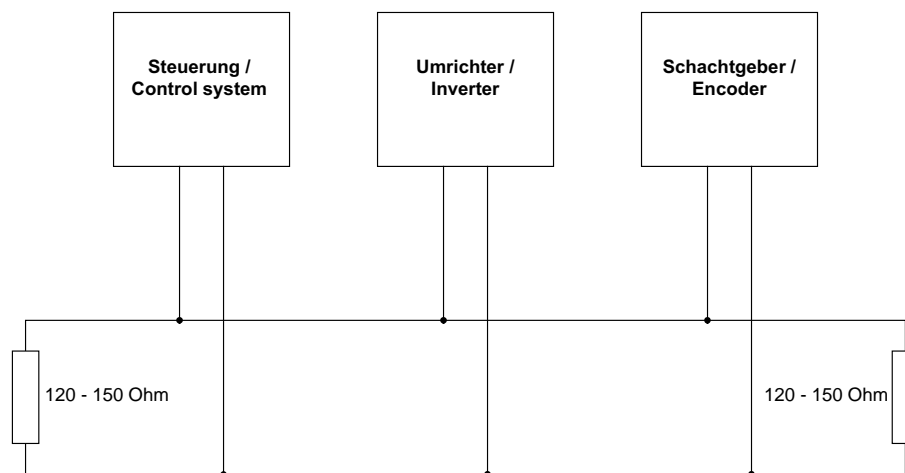
- Only devices with the CiA 417 profile are allowed.
- All devices work in 11 bit - mode.
- Without further measures, there can only be one ZAdyn4Bplus connected per bus system.
- When more than one ZAdyn4Bplus per bus-system are needed, please call Ziehl-Abegg before installing.

#### 10.2.1.3 Bus-cable

- A shielded bus-cable is not needed, but the data wires should be twisted.
- The wiring is in a linear structure. The individual devices are connected to the main line with short stub lines.
- The bus should be terminated with a terminating resistor of 120 - 150 Ohms, at both ends of the bus.
- The maximum length of the bus is 200 m and 6 m at the branch lines.
- All devices normally work with a baud rate of 250 kBit/s.

#### 10.2.1.4 Wiring

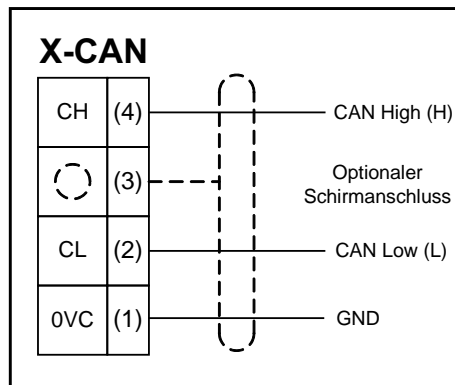
- The bus line is connected at the slot "X-CAN" of the ZAdyn4B.
- Take care of the maximum bus length.
- Not correctly shielded motor-, brake chopper- or brake resistor cables can cause significant errors.
- In case of an error, check the shielding of the cables.



Exemplary assembly of a bus-system with CANopen

### 10.2.1.5 Electrical connection

The bus cable is connected at the X-CAN interface of the ZAdyn4Bplus



Connection CAN

### 10.2.1.6 Activating the interface

The activation of the CAN interface can be set in the menu **Control system/CONFIG**.

```
Brake Control
↳ CONFIG 01:ZA_IO
  ↳ 02:ZA_CAN
Configuration
```

The INFO menu shows CAN information at the pages 14 - 17 (Assumption: "CONFIG" = "02: ZA\_CAN").

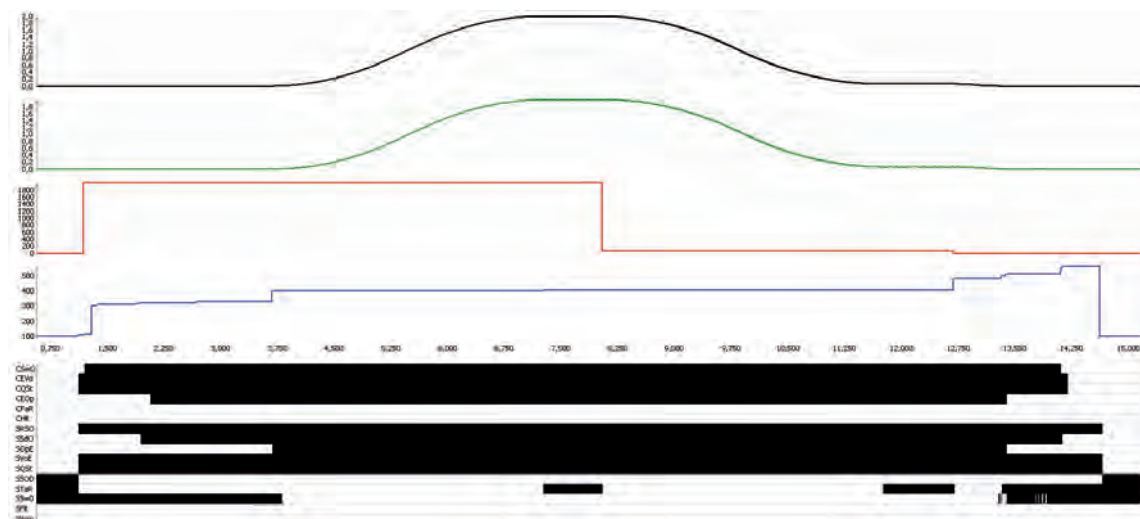
### 10.2.1.7 Operation modes



#### Information

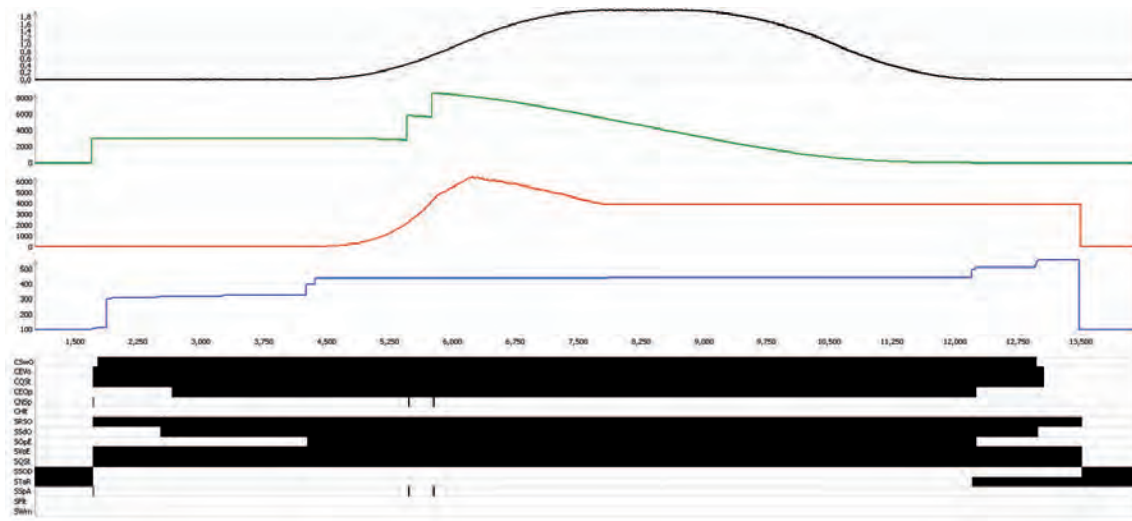
There are two operating modes for the ZAdyn4Bplus in CAN mode:

- Velocity Mode (Velocity Mode [pv])



Velocity Mode

- Position Mode (Position Mode [pp])



Position Mode

Most controls write the mode to the ZAdyn4Bplus shortly before start-up. This means that the operating mode must be set in the control.

If the ZAdyn4Bplus is operated in position mode, the shaft encoder must be connected to the same bus as the ZAdyn4Bplus.

The control system sends the required speed to the ZAdyn4Bplus before every journey. If this cannot be achieved, the ZAdyn4Bplus will initiate an arch travel journey. The maximum speed must therefore be entered in the control system.

**10.2.1.8 Command- and Statusbits of the recorder**

- Position Mode [pp] C&S / Velocity Mode [pv] C&S
- C = Command = command from the control to the frequency inverter
- S = Status = Status of the ZAdyn4Bplus as reaction to a prior command from the control system

Status- / Commandbit	Designation	Remarks
CSwO	Command Switch On	
CEVo	Command Enable Voltage	
CQSt	Command Quick Stop	
CEOp	Command Enable Operation	
CFaR	Command Fault Reset	
CNSp	Command New Setpoint	only active in position mode
CHIt	Command Halt	
SRSO	Status Ready to Switch On	
SSdO	Status Switched On	
SOpE	Status Operation Enabled	
SVoE	Status Voltage Enabled	
SQSt	Status Quick Stop	
SSOD	Status Switch On Disabled	
STaR	Status Target Reached	
SS=0	Status Speed = 0	only active in velocity mode
SSpA	Status Setpoint Acknowledge	only active in position mode
SFlt	Status Fault	
SWrn	Status Warning	

## 10.2.2 Parameter

### 10.2.2.1 Parameter settings

The different parameters for CAN operation can be adjusted in the **Control** menu.

Parameter	Designation	Value range	Factory setting
LIFT_NO	Enter the lift number	1 ... 2	1
NODE_ID	Node number, normally: Control system: 1 ZAdyn4Bplus: 2 Encoder: 4	1 ... 128	2
BD_RATE	Transmission rate (baud rate)	10 kBd ... 250 kBd	250 kBd
T_CMD	Maximum waiting time for commands of the control system	200 ... 3000 ms	1500 ms
T_MAX	Maximum processing time for the CAN messages per cycle.	0,1 ... 3 ms	0.8 ms

The CAN-specific displays are in the **Info menu** on **pages 14 - 17** (see chapter "Parameters List").



#### Information

The system speed  $V^*$  set in the ZAdyn4Bplus must be equal to or greater than the speed sent by the control system to the ZAdyn4Bplus. Otherwise no travel is possible.

### 10.2.2.2 Network Management Status

<b>Status:</b>	BootUp:	ZAdyn4Bplus is switching to the bus
	Stop:	ZAdyn4Bplus was stopped (normally by the control system)
	Preop.:	ZAdyn4Bplus can be parametrised, but has to be set to "operational" before the journey.
	Opera.:	ZAdyn4Bplus is ready, a journey can take place.
<b>Controller State:</b>	No Error:	No errors existent
	Warn.Lim.:	Error counter exceed 127
	Bus off:	Because of too many errors the device was switched off the bus (Error counter > 255)

## 11 Open loop operation (operation without encoder)

### Features of open loop operation:

- Distance-dependent deceleration not possible
- Possible communication with elevator 'control':
  - Standard (digital inputs and outputs)
  - DCP1, DCP3
  - CANopenLift (Velocity Mode)
- Round speed profile journey not possible
- This may cause excessive heating of the motor
- Lower positioning accuracy than in closed loop operation
- Worse travel behaviour than in closed loop operation
- maximum travel speed: 1,0 m/s

### 11.1 Commissioning

Step 1	Change operator level in the <b>Startup</b> menu <ul style="list-style-type: none"> <li>• USR_LEV = Advanced</li> </ul>																								
Step 2	Enter parameters in the <b>Motor name plate</b> menu  <b>Motor type</b> <ul style="list-style-type: none"> <li>• MOT_TYPE = ASM</li> </ul> <b>Technical data</b> The values correspond to the specifications on the motor name plate <ul style="list-style-type: none"> <li>• n = Nominal speed [rpm]</li> <li>• f = Frequency [Hz]</li> <li>• p = Number of pole pairs (value is calculated; entry not possible)</li> <li>• I = Nominal current [A]</li> <li>• U = Nominal voltage [V]</li> <li>• P = Nominal power [kW]</li> <li>• Cos phi = Power factor</li> <li>• TYP = Circuit type [Y/]</li> </ul>																								
Step 3	Checking plausibility of n: 1. Calculation of the speed $n_{syn}$ of the magnetic field in the motor winding. $n_{syn} = f \times 60 / p$ 2. Comparison of nominal speed n with speed $n_{syn}$ Depending on the pole pairs (see parameter p in the Motor name plate menu), the following difference must result between $n_{syn}$ and n: <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 30%;">Number of pole pairs (p)</th> <th style="width: 30%;">Difference <math>n_{syn} - n</math> [rpm]</th> <th style="width: 20%;"></th> </tr> </thead> <tbody> <tr> <td></td> <td>2</td> <td>80 – 120</td> <td></td> </tr> <tr> <td></td> <td>3</td> <td>50 – 80</td> <td></td> </tr> </tbody> </table> 3. If the calculated difference is outside the range specified in the table, the nominal speed n must be calculated using the formula in the table below and entered in the <b>Motor name plate</b> menu <table border="1" style="width: 100%; margin-top: 10px;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 30%;">Number of pole pairs (p)</th> <th style="width: 30%;">Calculation of nominal speed n [rpm]</th> <th style="width: 20%;"></th> </tr> </thead> <tbody> <tr> <td></td> <td>2</td> <td><math>n = n_{syn} - 100</math></td> <td></td> </tr> <tr> <td></td> <td>3</td> <td><math>n = n_{syn} - 65</math></td> <td></td> </tr> </tbody> </table>		Number of pole pairs (p)	Difference $n_{syn} - n$ [rpm]			2	80 – 120			3	50 – 80			Number of pole pairs (p)	Calculation of nominal speed n [rpm]			2	$n = n_{syn} - 100$			3	$n = n_{syn} - 65$	
	Number of pole pairs (p)	Difference $n_{syn} - n$ [rpm]																							
	2	80 – 120																							
	3	50 – 80																							
	Number of pole pairs (p)	Calculation of nominal speed n [rpm]																							
	2	$n = n_{syn} - 100$																							
	3	$n = n_{syn} - 65$																							
Step 4	Activate open loop operation in the <b>Encoder &amp; BC</b> menu <ul style="list-style-type: none"> <li>• ENC_TYP = No ENC</li> </ul> Assignment of the parameter ENC_type to the No ENC function activates open loop operation.																								

**11**  
 Open loop operation  
 (operation without encoder)

Step 5	<p>Enter parameters in menu <b>Installation</b>.</p> <ul style="list-style-type: none"> <li>• <math>V^*</math> = System nominal speed [m/s]</li> <li>• <math>MOD\_n^*</math> = Calculation</li> <li>• <math>n^*</math> = Motor speed at <math>V^*</math> [rpm] (value is calculated, entry not possible)</li> <li>• <math>\_D</math> = Traction sheave diameter [m]</li> <li>• <math>\_iS</math> = suspension</li> <li>• <math>\_i1</math> = i1 of the gear ratio i1:i2</li> <li>• <math>\_i2</math> = i2 of the gear ratio i1:i2</li> </ul>
Step 6	<p>Checking plausibility of <math>n^*</math>  The value determined for <math>n^*</math> must be less than or equal to the nominal speed <math>n</math> in the <b>Motor name plate</b> menu.  If <math>n^* &gt; n</math>, the parameter <math>V^*</math> must be reduced in the System data menu until <math>n^* &lt; n</math>.</p>
Step 7	<p>Enter the parameters in the <b>Travel</b> menu.</p> <ul style="list-style-type: none"> <li>• <math>V\_3</math> = <math>V^*</math> (nominal speed of the installation)</li> </ul> <p>In CANopen lift operation, this speed has to be configured in the control.</p>
Step 8	<p>Deactivate distance-dependent deceleration in the <b>Deceleration</b> menu</p> <ul style="list-style-type: none"> <li>• <math>S\_ABH</math> = Off</li> </ul>
Step 9	<p>Perform travel at reduced speed (e.g. recovery control)</p> <p><b>Requirements:</b></p> <ul style="list-style-type: none"> <li>• Weight balancing must be correct</li> <li>• The speed must be min. 30 % of the nominal system speed</li> </ul> <p>Move <b>up</b> and <b>down</b> with an empty cabin.</p> <ul style="list-style-type: none"> <li>• Travel in both directions possible</li> </ul> <p>-&gt; Continue with step 10</p> <ul style="list-style-type: none"> <li>• Motor does not rotate and travel is aborted:</li> </ul> <p>-&gt; Continue with "Open loop operation (operation without encoder)/Troubleshooting" chapter</p>
Step 10	<p>Perform travel at nominal system speed</p> <ul style="list-style-type: none"> <li>• Travel in both directions possible</li> </ul> <p>-&gt; Start-up is complete, no further steps necessary</p> <ul style="list-style-type: none"> <li>• Travel is aborted:</li> </ul> <p>-&gt; Continue with Troubleshooting</p>



## 11.2 Troubleshooting

Problem	Cause/Remedy
Motor does not rotate and travel is aborted	<ul style="list-style-type: none"> <li>• Travel is aborted with error:                             <ul style="list-style-type: none"> <li>– 410 ADC:Overcurrent</li> <li>– 480 MP:Overcurrent</li> <li>– No ZAdyn error message (interruption of travel by control)</li> </ul> </li> </ul> <p>-&gt; In the <b>Control</b> menu configure the <b>UF_ED = Manual</b> parameter                      -&gt; In the <b>Control</b> menu increase the <b>I_lxR</b> parameter in increments of 10 % until the motor rotates. Do not exceed the maximum value of 1.5 x nominal motor current.</p>
No stopping accuracy despite correctly set switch-off points	<ul style="list-style-type: none"> <li>• System travels too slowly during motor travel / stops before stop point                              -&gt; In the <b>Motor name plate</b> menu reduce the I parameter by 10 %</li> <li>• System travels too fast/passes stop point on motor travel                              -&gt; In the <b>Motor name plate</b> menu increase the I parameter by 10 %</li> <li>• System stays uneven as a function of load                              -&gt; In the <b>INFO menu Page 03: Dist.</b> check the s1 display to see whether a positioning run is being carried out at speed V_1</li> </ul> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>Dist. ----- 03 sa: 0.00 s21: 0.52m sx: ^0.00 s31: 1.45m s1: 0.00 sd: 0.52m</pre> </div> <p>- Travel at V_1 is carried out, system stops before stop point                      -&gt; In the <b>Travel</b> menu increase the <b>V_1</b> parameter by 10 %</p> <p>- Travel at V_1 is not carried out                      -&gt; Check switch-off points</p>
Error message during acceleration	<ul style="list-style-type: none"> <li>• Acceleration cancelled with error:                             <ul style="list-style-type: none"> <li>– 410 ADC:Overcurrent</li> <li>– 480 MP:Overcurrent</li> </ul> </li> </ul> <p>-&gt; In the <b>Accelerate</b> menu                      - Increase <b>R_POS1</b> parameter                      - Reduce <b>A_POS</b> parameter</p>
Error message during deceleration	<ul style="list-style-type: none"> <li>• Deceleration cancelled with error:                             <ul style="list-style-type: none"> <li>– 410 ADC:Overcurrent</li> <li>– 480 MP:Overcurrent</li> </ul> </li> </ul> <p>-&gt; In the <b>Deceleration</b> menu                      - Increase <b>R_NEG1</b> parameter                      - Reduce <b>A_NEG</b> parameter</p>

### 11.3 Parameters for open loop operation

For open loop operation, additional parameters for optimising travel performance are available in the **Control** menu.

The parameters are visible only when open loop operation is active.

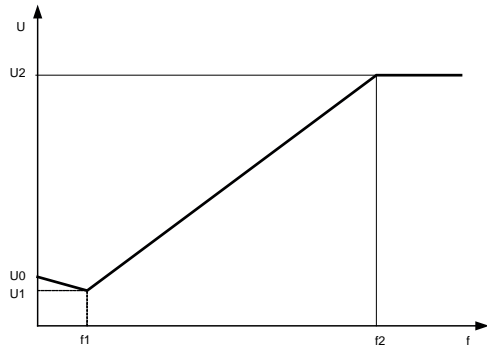
If it is necessary to change parameters, the parameter **Controller/UF\_ED=Manual** must be entered.

Parameter	Designation	Value range	Factory setting
UF_ED	U/f-Edit-mode Enabling the additional parameters with Open-Loop-operation (U/f)	Auto Manual	Auto
V_0	Minimum travel speed at start The setpoint for V_0 will be activated before the brake opens	0 ... 0.2 m/s	autom. preconfiguration
V_STOP	Minimum travel speed at stop The brake will be closed when the V_STOP is reached	0 ... 0.2 m/s	autom. preconfiguration
I_Kipp	Tilting protection: If the entered limit value is exceeded, the set value for the speed will be reduced.	0 ... 90 A	autom. preconfiguration
U0	Voltage at speed 0 of the frequency dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
U1	Start voltage of the frequency dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
U2	Corner voltage of the frequency dependent voltage characteristic	0 ... 460 V	autom. preconfiguration
f1	Start frequency of the frequency dependent voltage characteristic	0 ... 125 Hz	autom. preconfiguration
f2	Corner frequency of the frequency dependent voltage characteristic	0 ... 125 Hz	autom. preconfiguration
s_FIL	Filter for measuring motor current for the slip compensation	0 ... 400 ms	autom. preconfiguration
s_COMP	Operation with slip-compensation <b>On:</b> Slip-compensation is activated <b>Off:</b> Slip-compensation is deactivated	On Off	On
s_LIM	Maximum slip frequency compensation		autom. preconfiguration
U_S_MX	Maximum output voltage for the slip compensation	0 ... 300 V	80
I_IxR	Current controller, sets the minimum current with which the motor is energised	0 ... 90 A	Nominal current (I) of the motor
I_FIL	Filter of the motor current for the slip-compensation	0 ... 125 Hz	autom. preconfiguration
IxR_KP	P-contribution of the controller for the current	0 ... 10 V/A	autom. preconfiguration
IxR_TI	I-contribution of the controller for the current	5 ... 1000 ms	20 ms
IxR_KC	Correction factor of the controller for the current	0 ... 127	0.2
IxR_KD	D-contribution of the controller for the current	0 ... 3.0	0.0
IxR_MX	Maximum limitation of the controller	0 ... 100%	20
IxR_MN	Minimum limitation of the controller	0 ... 100%	0
FADE1	Fading-in and fading-out the current-control and the slip-compensation depending on the frequency of the rotating field in the stator	0 ... 125 Hz	autom. preconfiguration
FADE2	Fading-in and fading-out the current-control and the slip-compensation depending on the frequency of the rotating field in the stator	0 ... 125 Hz	autom. preconfiguration

## 11.4 Functions with Open-Loop-operation

### 11.4.1 U/f-characteristic curve

By entering the motor data in the **Motor rating plate** menu, the parameters "**U0**", "**U1**", "**U2**", "**f1**" and "**f2**" are pre-assigned. With these parameters, the U/f characteristic curve is defined that specifies the motor voltage dependent on the frequency of the rotary field in the stator.



U/f-characteristic curve

### 11.4.2 Current-control

To optimise starting, stopping and travelling at a low speed, the motor is energised with a minimum current (parameter **Control/I<sub>lxR</sub>**). With the parameters **FADE1** and **FADE2**, the current supply is specified depending on the frequency (f) of the rotary field in the stator.

#### **f < FADE1:**

If the frequency of the rotating field in the stator is less than FADE1, the motor will be energised with 100% of I<sub>lxR</sub>.

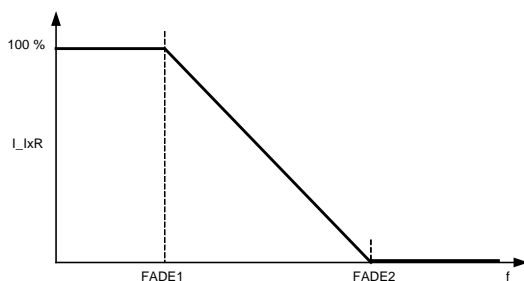
#### **f > FADE2:**

If the frequency of the rotating field in the stator is greater than FADE2 the current I<sub>lxR</sub> is 0

#### **FADE1 < f < FADE2:**

If the frequency of the rotating field is between FADE1 and FADE2 the current-control depends on the characteristic curve: the higher the frequency the lower is the current impression.

The characteristic curve is defined by the values for FADE1 and FADE2.



Fader-function for the current-control

### 11.4.3 Slip-compensation

With asynchronous motors the slip (difference between synchronous speed and asynchronous speed) is proportional to the load of the motor and therefore proportional to the motor current. This leads to different travel speeds in upwards and downwards direction with the same load.

Example:

The nominal speed of a motor is 1430 rpm. With empty car in downwards direction the speed is 1430 rpm. In upwards direction the speed is 1570 rpm.

The difference of 140 rpm will be settled by the slip-compensation.

The slip-compensation will be activated with the parameter **Controller/s\_COMP=On**.

```

Brake Control
↳ s_COMP On
  ↳ On
U/f: Slip compensation
    
```

**Functionality:**

The motor current is recorded by a filter (parameter **s\_FIL**). In proportion to the level of the measured current, the following occur:

- the slip-frequency will be added or subtracted to the output frequency of the U/f-characteristic curve
- voltage will be added to the output voltage of the U/f-characteristic curve

The additional values of the slip-compensation will be limited by following parameters:

```

Brake Control
↳ s_LIM 5 Hz
  ↳ 5
U/f: Slip limitation
    
```

Frequency: Parameter **s\_LIM**

```

Brake Control
↳ U_S_MX 80 V
  ↳ 80
U/f: Max. output volt.
    
```

Voltage: Parameter **U\_S\_MX**

The slip-compensation is specified depending on the parameters **FADE1** and **FADE2**.

**f < FADE1:**

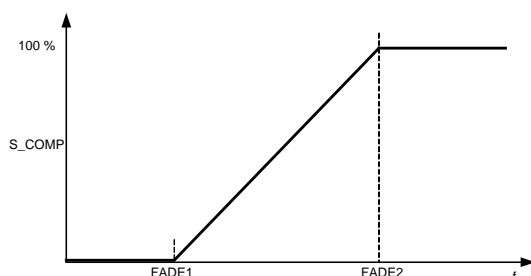
If the frequency of the rotating field in the stator is less than "FADE1" the slip-compensation is switched off.

**f > FADE2:**

If the frequency of the rotating field in the stator is greater than "FADE1" the slip-compensation is activated 100 %.

**FADE1 < f < FADE2**

If the frequency of the rotating field in the stator is between "FADE1" and "FADE2" the slip-compensation depends on the characteristic curve: the higher the frequency the higher the slip-compensation. The characteristic curve is defined by the values for "FADE1" and "FADE2". Thereby a seamless transition from current-control to slip compensation and backwards is existing.



Fader-function with slip-compensation

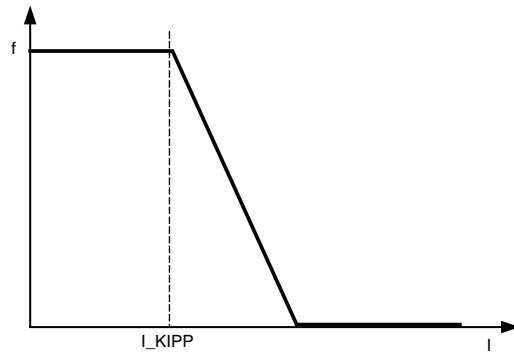
#### 11.4.4 Tilting protection

Avoids an uncontrolled tilting of the speed.

##### Functionality:

The motor current is recorded by a filter (parameter **s\_FIL**).

If the limit value set for the current (parameter **I\_KIPP**) is reached, the specified target value for the speed is reduced in line with the motor current.



Tilting protection

### 11.5 Improvements with Open-Loop-operation



#### Information

The described possibilities for improvements apply only to parameter which are available only in the U/f-operation mode (Open-Loop).

Possibilities for improving travel curve or the signal-timing are described in the chapter "Commissioning".

#### 11.5.1 Optimizing start up behavior

If the motor turns back when starting up, does not start or an overcurrent occurs immediately after opening the mechanical brake, the minimum current that is fed to the motor is too low. In this case, the **Control / I\_IxR** parameter can be increased to minimise travel.

```

Brake Control
↳ I_IxR 15      A
↳      18
    
```

#### 11.5.2 Slip-compensation

Due to the different speeds in upwards and downwards direction the different positioning travels or inexactness during the stopping can occur. By having nearly the same speed in both directions these inaccuracies can be minimised. The adjustment of the speed is carried out by the slip-compensation.

The slip-compensation will be activated with the parameter **Controller/s\_COMP=On**.

```

Brake Control
↳ s_COMP On
↳      On
U/f: Slip compensation
    
```

## 12 Parameter list



### Information

Not all the described parameters are freely accessible and visible. The display depends on the selected functions and settings in the ZAdyn4Bplus.

The individual parameters are subdivided into various menus based on their functions.

### 12.1 Basic-Level

The **Startup**, **Statistic** and **Memory Card** menus are displayed in the basic level.

The **Startup** menu is only displayed in the basic level. The **Statistic** and **Memory Card** menus are displayed in both the basic level and advanced level. They are described in the chapters "Parameters List / Statistic Menu" and "Parameters List / Memory Card Menu". See the chapter "Operation and Parameterisation / The different operating levels" for information about the basic level.

#### 12.1.1 Startup menu

All the parameters required for first-time start-up are contained in the **Start-up** menu.

Parameter	Designation	Value range	Factory setting
LANG	Select the desired operating language. The operating languages German and English are integrated into the device as standard. A third operating language can be loaded with the memory card. To do this, the language files must be stored on the memory card in the following folder: 4CX\Update\0_TEXT	Deutsch English Türkce Nederland Espanol Italiano Svenska Cesky Francais Polski Russki	Deutsch
USR_LEV	User Level Selection via the user level which is available in the when starting the ZAdyn4Bplus.	Basic Advanced	Basic
MOT_TYP	Enter the operated motor type <b>A</b> <b>ASM</b> :Asynchronous motor <b>S</b> <b>SMxxx</b> : Synchronous motor, third-party product <b>SM132.xx-14</b> : ZIEHL-ABEGG synchronous motor type SM132 <b>SM160.xx-20</b> : ZIEHL-ABEGG synchronous motor type SM160 <b>SM180.xx-14</b> : ZIEHL-ABEGG synchronous motor type SM180 <b>SM190.xx-20</b> : ZIEHL-ABEGG synchronous motor type SM190 <b>SM200.xx-20</b> : ZIEHL-ABEGG synchronous motor type SM200 <b>SM210.xx-20</b> : ZIEHL-ABEGG synchronous motor type SM210 <b>SM225.xx-20</b> : ZIEHL-ABEGG synchronous motor type SM225 <b>SM250.xx-20</b> : ZIEHL-ABEGG synchronous motor type SM250 <b>SM315.xx-30</b> : ZIEHL-ABEGG synchronous motor type SM315 <b>SM700.xx-30</b> : ZIEHL-ABEGG synchronous motor type SM700 <b>SM860.xx-30</b> : ZIEHL-ABEGG synchronous motor type SM860 <b>SL506.xx-30</b> : ZIEHL-ABEGG synchronous motor type SL506 <b>SL510.xx-28</b> : ZIEHL-ABEGG synchronous motor type SL510 <b>BD132.xx-14</b> : ZIEHL-ABEGG synchronous motor type BD132 <b>SM500.xx-24</b> : ZIEHL-ABEGG synchronous motor type SM500	ASM SMxxx SM132.xx-14 SM160.xx-20 SM180.xx-14 SM190.xx-20 SM200.xx-20 SM210.xx-20 SM225.xx-20 SM250.xx-20 SM315.xx-30 SM700.xx-30 SM860.xx-30 SL506.xx-30 SL510.xx-28 BD132.xx-14 SM500.xx-24	SM225.xx-20
n	Enter the motor's rated speed	0.1 ... 6000 rpm	Depends on configured motor type
f	Enter the motor's rated frequency	0.1 ... 200 Hz	
I	Enter the motor's rated current	0.1 ... 363 A	
U	Enter the motor's rated voltage Enter the motor's rated current	0.1 ... 460 V	
P	Enter the motor's rated power	0.1 ... 110 kW	

Parameter	Designation	Value range	Factory setting
cos phi	<a href="#">A</a> Enter the motor's power factor (only for asynchronous motors)	0.10 ... 1.0	0.88
TYP	Enter the motor's type of connection	Star Triangle	Star
ENC_TYP	Enter the type of encoder used <a href="#">S</a> <b>EnDat/SSI:</b> Absolute rotary encoder Position information is transmitted either via SSI (synchronous serial interface) or EnDat protocol <b>ERN1387:</b> Absolute encoder Position information is transmitted by analog signal <b>Hiperface:</b> absolute encoder <b>Codeface:</b> absolute encoder <b>BiSS-C:</b> Absolute value encoder with BiSS-C interface <a href="#">A</a> <b>TTL sine:</b> 5 V rotary encoder with sine signal <b>TTL rect.:</b> 5 V rotary encoder with rectangle signal <b>HTL 10-30 V:</b> 10-30 V rotary encoder with rectangle signal <b>No ENC:</b> Open loop operation	EnDat/SSI HTL 10-30V TTL rect. TTL Sine Hiperface Codeface ERN1387 No ENC. BiSS-C	Depends on configured motor type
ENC_INC	Enter encoder resolution (pulses/revolution)	64 ... 11000	
BC_TYP	Enter the used brake resistor or brake chopper <b>BR11:</b> Brake resistor type BR11-A <b>BR50:</b> Brake resistor type BR50 <b>BR50+BR25:</b> parallel connection of BR25 and BR50 <b>BR50+BR50:</b> parallel connection of 2 pieces BR50 <b>BRxx:</b> Brake resistor external product <b>PFU:</b> Power Feedback Unit <b>PFU+BR11:</b> Power Feedback Unit + Brake resistor type BR11 <b>PFU+BR17:</b> Power Feedback Unit + Brake resistor type BR17 <b>PFU+BR25:</b> Power Feedback Unit + Brake resistor type BR25 <b>PFU+BR50:</b> Power Feedback Unit + Brake resistor type BR50 <b>BR09-1:</b> Brake-Resistor Type BR09-1 <b>BR14:</b> Brake resistor type BR14 <b>BR100:</b> Brake resistor type BR100 <b>PFU+BRxx:</b> Power Feedback Unit + Brake resistor external product <b>2*BR100:</b> parallel connection of 2 pieces BR100 <b>3*BR100:</b> Parallel circuit of three BR100 <b>BR17-1:</b> Brake resistor type BR17 <b>BR25-1:</b> Brake resistor type BR25 <b>BC25:</b> Brake-Chopper type BC25 <b>BC50:</b> Brake-Chopper type BC50 <b>BC100:</b> Brake-Chopper type BC100 <b>ZArec:</b> ZArec feedback unit <b>4*BR4:</b> parallel connection of 4 pieces BR100	BR11 BR50 BR50+BR25 BR50+BR50 BRxx PFU PFU+BR11 PFU+BR17 PFU+BR25 PFU+BR50 BR09-1 BR14 BR100 PFU+BRxx 2* BR100 3* BR100 BR17 BR25 BC25 BC50 BC100 ZArec 4*BR100	BR17
V*	Enter the installation rated speed	0.00 ... 10.00 m/s	1.00
n*	Motor speed at V* <b>MOD_n = direct:</b> direct input of the motor speed at V* <b>MOD_n = calculate:</b> Calculates the speed of the motor dependent on: V*; __D; __iS; __; __i1 and __i2	0.1 ... 6000 rpm	<a href="#">A</a> 1358.1 <a href="#">S</a> 60.6
__D	Enter the diameter of the traction sheave	0.06 ... 1.50 m	<a href="#">A</a> 0.45 <a href="#">S</a> 0.315

Parameter	Designation	Value range	Factory setting
<b>__iS</b>	Enter the installation's type of suspension	1:1 2:1 3:1 4:1 5:1 6:1 7:1 8:1	1:1
<b>__i1</b>	Entry of <b>i1</b> gearbox ratio <b>i1:i2</b>	1 ... 650	1
<b>__i2</b>	Input of <b>i2</b> of the gearbox ratio <b>i1:i2</b>	1 ... 1000	32
<b>Q</b>	Enter the elevator installation's rated load	100 to 32000	600
<b>CONFIG</b>	Configuration of the digital inputs according to the used control system and type of communication <b>00:Free:</b> Outputs are freely configurable <b>01:ZA_IO:</b> Ziehl-Abegg standard actuation <b>02:ZA_CAN:</b> Ziehl-Abegg CAN <b>03:BP_IO:</b> Böhnke+Partner standard control <b>04:BP_DCP1:</b> Böhnke & Partner DCP1 <b>05:BP_DCP2:</b> Böhnke & Partner DCP2 <b>06:BP_DCP3:</b> Böhnke & Partner DCP3 <b>07:BP_DCP4:</b> Böhnke & Partner DCP4 <b>08:KN_IO:</b> Kollmorgen standard control <b>09:KN_DCP3:</b> Kollmorgen DCP3 <b>10:KN_DCP4:</b> Kollmorgen DCP4 <b>11:NL_IO:</b> New Lift standard control <b>12:NL_DCP3:</b> New Lift DCP3 <b>13:SS_IO:</b> Schneider Steuerungen standard control <b>14:SS_DCP3:</b> Schneider controls DCP3 <b>15:ZA_BIN:</b> Ziehl-Abegg standard actuation with binary speed specification <b>16:WL_IO:</b> Weber Liftechnik standard control <b>17:WL_DCP1:</b> Weber Liftechnik DCP1 <b>18:WL_DCP2:</b> Weber Liftechnik DCP2 <b>19:WL_DCP3:</b> Weber Liftechnik DCP3 <b>20:WL_DCP4:</b> Weber Liftechnik DCP4 <b>21:ST_IO:</b> Strack Lift Automation standard control <b>22:ST_DCP3:</b> Strack Lift Automation DCP3 <b>23:ST_DCP4:</b> Strack Lift Automation DCP4 <b>24:CSILVA:</b> Carlos Silva standard control <b>25:X-BIN:</b> Free binary assignment <b>26:KW_DCP3:</b> KW Aufzugstechnik DCP3 <b>27:MAS_BIN:</b> Masora standard control <b>28:BU_SATU:</b> Hydraulic elevator aggregate with Bucher-Aggregat type Saturn ALPHA <b>29:BU_ORIO:</b> Hydraulic elevator aggregate with Bucher-Aggregat type Orion ALPHA <b>30:KS_IO:</b> Georg Kühn Control systems standard control <b>31:KL_IO:</b> Kleemann standard control <b>32:S_SMART:</b> Schindler Smart standard control <b>33:SS_DCP4:</b> Schneider controls DCP4 <b>34:OS_DCP3:</b> Osma DCP3 <b>35:Lester:</b> Lester Controls <b>36:HY-Mod.:</b> Hydraulic elevator with DCP4 <b>37:NL_DCP4:</b> New Lift DCP4	00:Free 01:ZA_IO 02:ZA_CAN 03:BP_IO 04:BP_DCP1 05:BP_DCP2 06:BP_DCP3 07:BP_DCP4 08:KN_IO 09:KN_DCP3 10:KN_DCP4 11:NL_IO 12:NL_DCP3 13:SS_IO 14:SS_DCP3 15:ZA_BIN 16:WL_IO 17:WL_DCP1 18:WL_DCP2 19:WL_DCP3 20:WL_DCP4 21:ST_IO 22:ST_DCP3 23:ST_DCP4 24:CSILVA 25:X-BIN 26:KW_DCP3 27:MAS_BIN 28:BUcher_SATU 29:BUcher_ORIO 30:KS_IO 31:KL_IO 32:S_SMART 33:SS_DCP4 34:OS_DCP3 35:Lester 36:HY-Mod. 37:NL_DCP4	01:ZA_IO



Parameter	Designation	Value range	Factory setting
MO_DR	Changing the rotating direction of the motor It must be observed that with triggering the input RV1 the cabin drives upwards <b>left:</b> Rotary direction left <b>Right:</b> Clockwise rotation	left right	left
BR	Motor brake monitoring Input of number and function of the brake monitoring contacts used <b>OFF:</b> No brake monitoring connected <b>1*NC:</b> 1x normally closed contact (Contact closed when brake currentless) <b>2x NC:</b> 2x Normally closed contact (contact closed when brake is currentless) <b>3x NC:</b> 3x Normally closed contact (contact closed when brake is currentless) <b>1*NO:</b> 1 x normally open (contact is open when brake currentless) <b>2x NO:</b> 2x Normally open contact (contact open when brake is currentless) <b>3x NO:</b> 3x Normally open contact (contact open when brake is currentless) <b>4*NC:</b> 4 x normally closed contact (Contact closed when brake currentless) <b>4*NO:</b> 4 x normally open (contact is open when brake currentless) <b>1xNC+1xNO:</b> 1x NC contact (BR1) and 1x NO contact (BR2)	Off 1*NC 2*NC 3*NC 1*NO 2*NO 3*NO 4*NC 4*NO 1*NC+1*NO	accordingly to motor type
P1P2	Motor temperature monitoring <b>OFF:</b> Temperature monitoring deactivated <b>PTC:</b> thermistor (PTC according to DIN 44082) <b>TC:</b> Thermal circuit breaker <b>KTY:</b> Temperature sensor KTY84-130 <b>Pt100:</b> Temperature sensor Pt100 <b>Pt1000:</b> Temperature sensor Pt1000	Off PTC TC KTY Pt100 Pt1000	PTC
K_START	Start gain Multiplication factor for the parameter "Controller/SPD_KP" or amplification of the position controller (dependent on the start-up mode)	is automatically limited	1.0
SPD_KP	Multiplication factor to modify the calculated basic amplification SPD_C	is automatically limited	1.0
NF	Noise Filter This parameter activates a noise filter that enables noise caused by the motor to be reduced.	Off On	Off
NF_F1	Filter-Freq.1: Number of slots Enter the number of slots on a synchronous motor.	0...1018	0

## 12.2 Advanced-Level

The menus of the advanced level are described below. See the chapter "Operation and Parameterisation / The different operating levels" for information about the advanced level.

### 12.2.1 LCD & Password menu

Selection the desired operating language. Protects the ZAdyn4Bplus from access by third parties by assigning a password. Modifying the parameters is only possible after entering the password. A password is not set at the factory.

Parameter	Designation	Value range	Factory setting
LANG	Select the desired operating language. The operating languages German and English are integrated into the device as standard. A third operating language can be loaded with the memory card. To do this, the language files must be stored on the memory card in the following folder: 4CX\Update\0_TEXT	Deutsch English Türkce Nederland Espanol Italiano Svenska Cesky Francais Polski Russki	Deutsch
USR_LEV	User Level Selection via the user level which is available in the ZAdyn4Bplus when starting the ZAdyn4Bplus.	Basic Advanced	Basic
PASSWD	Enter password.	0 ... 9999	0
PW_NEW	New password A number between 0 and 9999 can be used as a password 0 = no password	0 ... 9999	0
PW_COD	Displays the password in coded form. If you lose the password, please contact the manufacturer.	Cannot be set	21689

### 12.3 Motor name plate menu

Enter the motor data in accordance with the data on the motor name plate.



#### Information

The motor data must be configured before the first trip!

The procedure for entering the motor data is described in the "Commissioning" chapter.

Parameter	Designation	Value range	Factory setting
MOT_TYP	Enter the operated motor type <b>A</b> ASM:Asynchronous motor <b>S</b> SMxxx: Synchronous motor, third-party product SM132.xx-14: ZIEHL-ABEGG synchronous motor type SM132 SM160.xx-20: ZIEHL-ABEGG synchronous motor type SM160 SM180.xx-14: ZIEHL-ABEGG synchronous motor type SM180 SM190.xx-20: ZIEHL-ABEGG synchronous motor type SM190 SM200.xx-20: ZIEHL-ABEGG synchronous motor type SM200 SM210.xx-20: ZIEHL-ABEGG synchronous motor type SM210 SM225.xx-20: ZIEHL-ABEGG synchronous motor type SM225 SM250.xx-20: ZIEHL-ABEGG synchronous motor type SM250 SM315.xx-30: ZIEHL-ABEGG synchronous motor type SM315 SM700.xx-30: ZIEHL-ABEGG synchronous motor type SM700 SM860.xx-30: ZIEHL-ABEGG synchronous motor type SM860 SL506.xx-30: ZIEHL-ABEGG synchronous motor type SL506 SL510.xx-28: ZIEHL-ABEGG synchronous motor type SL510 BD132.xx-14: ZIEHL-ABEGG synchronous motor type BD132 SM500.xx-24: ZIEHL-ABEGG synchronous motor type SM500	ASM SMxxx SM132.xx-14 SM160.xx-20 SM180.xx-14 SM190.xx-20 SM200.xx-20 SM210.xx-20 SM225.xx-20 SM250.xx-20 SM315.xx-30 SM700.xx-30 SM860.xx-30 SL506.xx-30 SL510.xx-28 BD132.xx-14 SM500.xx-24	SM225.xx-20
n	Enter the motor's rated speed	0.1 ... 6000 rpm	Depends on configured motor type
f	Enter the motor's rated frequency	0.1 ... 200 Hz	
p	Displays the number of pole pairs of the motor		
I	Enter the motor's rated current	0.1 ... 363 A	
U	Enter the motor's rated voltage	0.1 ... 460 V	

Parameter	Designation	Value range	Factory setting
<b>P</b>	Enter the motor's rated power	0.1 ... 110 kW	
<b>cos phi</b>	<a href="#">A</a> Enter the motor's power factor (only for asynchronous motors)	0.10 ... 1.0	
<b>TYP</b>	Enter the motor's type of connection	Star Triangle	Star
<b>M_MAX</b>	Maximum motor torque	0.2 ... 5.0	2.0

## 12.4 Encoder & BC menu

Enter:

- Rotary encoder type
- Rotary encoder resolution
- used Brake-Chopper or Brake resistor type

Parameter	Designation	Value range	Factory setting
<b>ENC_TYP</b>	Enter the type of encoder used <a href="#">S</a> <b>EnDat/SSI:</b> Absolute rotary encoder Position information is transmitted either via SSI (synchronous serial interface) or EnDat protocol <b>ERN1387:</b> Absolute encoder Position information is transmitted by analog signal <b>Hiperface:</b> absolute encoder <b>Codeface:</b> absolute encoder <b>BiSS-C:</b> Absolute value encoder with BiSS-C interface <a href="#">A</a> <b>TTL sine:</b> 5 V encoder with sine signal <b>TTL rect.:</b> 5 V encoder with rectangle signal <b>HTL 10-30 V:</b> 10-30 V encoder with square-wave signal <b>No ENC:</b> Open loop operation	EnDat/SSI HTL 10-30V TTL rect. TTL Sine Hiperface Codeface ERN1387 No ENC. BiSS-C	EnDat/SSI
<b>ENC_INC</b>	Enter encoder resolution (pulses/revolution)	64 ... 11000	2048
<b>BC_TYP</b>	Enter the used brake resistor or brake chopper <b>BR11:</b> Brake resistor type BR11-A <b>BR50:</b> Brake resistor type BR50 <b>BR50+BR25:</b> parallel connection of BR25 and BR50 <b>BR50+BR50:</b> parallel connection of 2 pieces BR50 <b>BRxx:</b> Brake resistor external product <b>PFU:</b> Power Feedback Unit <b>PFU+BR11:</b> Power Feedback Unit + Brake resistor type BR11 <b>PFU+BR17:</b> Power Feedback Unit + Brake resistor type BR17 <b>PFU+BR25:</b> Power Feedback Unit + Brake resistor type BR25 <b>PFU+BR50:</b> Power Feedback Unit + Brake resistor type BR50 <b>BR09-1:</b> Brake-Resistor Type BR09-1 <b>BR14:</b> Brake resistor type BR14 <b>BR100:</b> Brake resistor type BR100 <b>PFU+BRxx:</b> Power Feedback Unit + Brake resistor external product <b>2*BR100:</b> parallel connection of 2 pieces BR100 <b>3*BR100:</b> Parallel circuit of three BR100 <b>BR17-1:</b> Brake resistor type BR17 <b>BR25-1:</b> Brake resistor type BR25 <b>BC25:</b> Brake-Chopper type BC25 <b>BC50:</b> Brake-Chopper type BC50 <b>BC100:</b> Brake-Chopper type BC100 <b>ZArec:</b> ZArec feedback unit <b>4*BR4:</b> parallel connection of 4 pieces BR100	BR11 BR50 BR50+BR25 BR50+BR50 BRxx PFU PFU+BR11 PFU+BR17 PFU+BR25 PFU+BR50 BR09-1 BR14 BR100 PFU+BRxx 2*BR100 3*BR100 BR17 BR25 BC25 BC50 BC100 ZArec 4*BR100	BR17

<b>R_BR</b>	Enter resistance of brake resistor when third-party product used ("BC_TYP=BRxx")	4 ... 200 Ohm	64
<b>P_BR</b>	Enter rating performance when third-party product used ("BC_TYP=BRxx")	0.0 ... 65 kW	0.5
<b>T_PFU</b>	Input of time between end of run and activation of the output with the PFU function <b>Input 0:</b> Function deactivated	0 ... 600 s	0

## 12.5 Installation menu

Enter of installation specific data



### Information

The installation data must be configured before the first trip!

The procedure for calculating the installation nominal speed and to preset the travel data is described in the "Commissioning" chapter.

Parameter	Designation	Value range	Factory setting
<b>V*</b>	Enter the installation rated speed	0.00 ... 10.00 m/s	1.00
<b>MOD_n*</b>	Input type of the motor speed at installation rated speed <b>direct:</b> manual input of n* <b>Calculate:</b> Calculates the speed of the motor dependent on: V*; __D; __iS; __; __i1 and __i2	direct Calculate	Calculate
<b>n*</b>	Motor speed at V* <b>MOD_n = direct:</b> direct input of the motor speed at V* <b>MOD_n = calculate:</b> Calculates the speed of the motor dependent on: V*; __D; __iS; __; __i1 and __i2	0.1 ... 6000 rpm	<a href="#">A</a> 1358.1 <a href="#">S</a> 60.6
<b>__D</b>	Enter the diameter of the traction sheave	0.06 ... 1.50 m	<a href="#">A</a> 0.45 <a href="#">S</a> 0.315
<b>__iS</b>	Enter the installation's type of suspension	1:1 2:1 3:1 4:1 5:1 6:1 7:1 8:1	1:1
<b>__i1</b>	Input of i1 of the gearbox ratio i1:i2  The parameter __i1 is only visible for operation with asynchronous motors.	1 ... 650	1
<b>__i2</b>	Input of i2 of the gearbox ratio i1:i2  The parameter __i2 is only visible for operation with asynchronous motors.	1 ... 1000	32
<b>Q</b>	Enter the elevator installation's rated load	100 ... 32000 kg	600
<b>F</b>	Enter the car weight	100 ... 32000 kg	1000
<b>G</b>	Enter the counterweight	0 ... 32000 kg	1300

## 12.6 Control system menu

Configuring of:

- elevator control system
- Digital inputs
- Digital outputs

Parameter	Designation	Value range	Factory setting
<b>CONFIG</b>	<p>Configuration of the digital inputs and outputs according to the control system and type of communication used</p> <p><b>00:Free:</b> Outputs are freely configurable</p> <p><b>01:ZA_IO:</b> Ziehl-Abegg standard actuation</p> <p><b>02:ZA_CAN:</b> Ziehl-Abegg CAN</p> <p><b>03:BP_IO:</b> Böhnke+Partner standard control</p> <p><b>04:BP_DCP1:</b> Böhnke &amp; Partner DCP1</p> <p><b>05:BP_DCP2:</b> Böhnke &amp; Partner DCP2</p> <p><b>06:BP_DCP3:</b> Böhnke &amp; Partner DCP3</p> <p><b>07:BP_DCP4:</b> Böhnke &amp; Partner DCP4</p> <p><b>08:KN_IO:</b> Kollmorgen standard control</p> <p><b>09:KN_DCP3:</b> Kollmorgen DCP3</p> <p><b>10:KN_DCP4:</b> Kollmorgen DCP4</p> <p><b>11:NL_IO:</b> New Lift standard control</p> <p><b>12:NL_DCP3:</b> New Lift DCP3</p> <p><b>13:SS_IO:</b> Schneider Steuerungen standard control</p> <p><b>14:SS_DCP3:</b> Schneider controls DCP3</p> <p><b>15:ZA_BIN:</b> Ziehl-Abegg standard actuation with binary speed specification</p> <p><b>16:WL_IO:</b> Weber Liftechnik standard control</p> <p><b>17:WL_DCP1:</b> Weber Liftechnik DCP1</p> <p><b>18:WL_DCP2:</b> Weber Liftechnik DCP2</p> <p><b>19:WL_DCP3:</b> Weber Liftechnik DCP3</p> <p><b>20:WL_DCP4:</b> Weber Liftechnik DCP4</p> <p><b>21:ST_IO:</b> Strack Lift Automation standard control</p> <p><b>22:ST_DCP3:</b> Strack Lift Automation DCP3</p> <p><b>23:ST_DCP4:</b> Strack Lift Automation DCP4</p> <p><b>24:CSILVA:</b> Carlos Silva standard control</p> <p><b>25:X-BIN:</b> Free binary assignment</p> <p><b>26:KW_DCP3:</b> KW Aufzugstechnik DCP3</p> <p><b>27: MAS_BIN:</b> Masora standard control</p> <p><b>28: BU_SATU:</b> Hydraulic elevator aggregate with Bucher-Aggregat type Saturn ALPHA</p> <p><b>29: BU_ORIO:</b> Hydraulic elevator aggregate with Bucher-Aggregat type Orion ALPHA</p> <p><b>30: KS_IO:</b> Georg Kühn Control systems standard control</p> <p><b>31: KL_IO:</b> Kleemann standard control</p> <p><b>32: S_SMART:</b> Schindler Smart standard control</p> <p><b>33: SS_DCP4:</b> Schneider controls DCP4</p> <p><b>34: OS_DCP3:</b> Osma DCP3</p> <p><b>35: Lester:</b> Lester Controls</p> <p><b>36: HY-Mod.:</b> Hydraulic elevator with DCP4</p> <p><b>37: NL_DCP4:</b> New Lift DCP4</p>	<p>00:Free</p> <p>01:ZA_IO</p> <p>02:ZA_CAN</p> <p>03:BP_IO</p> <p>04:BP_DCP1</p> <p>05:BP_DCP2</p> <p>06:BP_DCP3</p> <p>07:BP_DCP4</p> <p>08:KN_IO</p> <p>09:KN_DCP3</p> <p>10:KN_DCP4</p> <p>11:NL_IO</p> <p>12:NL_DCP3</p> <p>13:SS_IO</p> <p>14:SS_DCP3</p> <p>15:ZA_BIN</p> <p>16:WL_IO</p> <p>17:WL_DCP1</p> <p>18:WL_DCP2</p> <p>19:WL_DCP3</p> <p>20:WL_DCP4</p> <p>21:ST_IO</p> <p>22:ST_DCP3</p> <p>23:ST_DCP4</p> <p>24:CSILVA</p> <p>25:X-BIN</p> <p>26:KW_DCP3</p> <p>27:MAS_BIN</p> <p>28:Bucher_SATU</p> <p>29:Bucher_ORIO</p> <p>30:KS_IO</p> <p>31:KL_IO</p> <p>32:S_SMART</p> <p>33:SS_DCP4</p> <p>34:OS_DCP3</p> <p>35:Lester</p> <p>36:HY-Mod.</p> <p>37:NL_DCP4</p>	01:ZA_IO
<b>MO_DR</b>	<p>Changing the rotating direction of the motor</p> <p>It must be observed that with triggering the input RV1 the cabin drives upwards</p> <p><b>left:</b> Rotary direction left</p> <p><b>Right:</b> Clockwise rotation</p>	<p>left</p> <p>right</p>	left

Parameter	Designation	Value range	Factory setting
<b>CTRL</b>	Select the communication between the frequency inverter and the control under "CONFIG=Free" <b>Standard:</b> Parallel connection <b>DCP1:</b> Communication by DCP01 protocol <b>DCP2:</b> Communication by DCP02 protocol <b>DCP3:</b> Communication by DCP03 protocol <b>DCP4:</b> Communication by DCP04 protocol <b>CAN:</b> Communication via CANopen Lift protocol	Standard DCP01 DCP02 DCP03 DCP04 CAN	Standard
<b>X_BIN_1</b>	Allocation of travelling speeds to binary codes for "CONFIG=X_BIN" (for description of functions, see "Parameter description for digital inputs" table).	00:Free	00:Free
<b>X_BIN_2</b>		04:V1	
<b>X_BIN_3</b>		05:V2	
<b>X_BIN_4</b>		06:V3	
<b>X_BIN_5</b>		07:VZ	
<b>X_BIN_6</b>		08:V4	
<b>X_BIN_7</b>		09:V5	
		10:V6	
		11:V7	
		17:v=0	

Parameter	Designation	Value range	Factory setting
f_I01	Configuration of the function of digital inputs I01 ... I08 for "CONFIG=free" (for description of the functions, see "Parameter description for digital inputs" table). Input I08 is free adjustable, independent of "CONFIG".	00:Free	01:RF
f_I02		01:RF	04:V1
f_I03		02:RV1-UP	05:V2
f_I04		03:RV2-DOWN	06:V3
f_I05		04:V1	07:VZ
f_I06		05:V2	02:RV1-UP
f_I07		06:V3	03:RV2-DOWN
f_I08		07:VZ	00:Free
f_XBR1	Configuration of the function of brake monitoring inputs BR1 ... BR4 (for description of functions, see "Parameter description for digital inputs" table)	08:V4	20:BR1
f_XBR2		09:V5	21:BR2
f_XBR3		10:V6	22:BR3
f_XBR4		11:V7	00:Free
		12:PARA2	
		13:BIN0	
		14:BIN1	
		15:BIN2	
		16:DIR(1=UP)	
		17:v=0	
		18:RF+RV1	
		19:RF+RV2	
		20:BR1	
		21:BR2	
	22:BR3		
	23:BR4		
	24:XBIN0		
	25:XBIN1		
	26:XBIN2		
	27:MBIN0		
	28:MBIN1		
	29:MBIN2		
	30:STANDBY2		
	31:STEP+		
	32:STEP-		
	33:PFU_BR		
	34:HY_UP		
	35:HY_DOWN		
	36:/DELAY		
	37:DTE		
	38:RECORD		
	39:INV_A1		
	40:FKT.ana		
	41:Monitor		
	43:STANDBY1		
	44:ZR_RDY		
	45:/ESC		
	46:SBC_RDY		
	47:CO		
	48:EVA act.		
	49:MOT_TEMP		
	50:RF+V1		

Parameter	Designation	Value range	Factory setting
f_O1	Configuration of the function of digital outputs O1 ... O5 for "CONFIG=free" (for description of functions, see "Parameter description for digital outputs" table).	Off	Fault
f_O2		RB	MB_Brake
f_O3		/RB	RB contactor
f_O4		V<V_G1	V < V_G1
f_O5		V<V_G2	STO-Info
	V<1.1*V_3		
	Warning		
	Fault		
	Evac.Dir.		
	MB_Brake		
	/V<V_G1		
	/V<V_G2		
	V=0		
	PFU		
	Info rope		
	TD_CNT ext.		
	Full load		
	SD		
	STO-Info		
	/STO info		
	BR Info		
	ZR_EN		
	Stutter br.		
	MotShorts		
	EvaDisMains		
	P<0		
	Fan fault [VentStrg]		
	ZAdyn ready		
V_G1	Presetting of the limit value 1 when using the V<V_G1 parameter for a digital output	0.03 ... 3.20 m/s	0.30
V_G2	Presetting of the limit value 2 when using the V<V_G2 parameter for a digital output	0.03 ... 3.20 m/s	0.80
V_G3	Presetting of the limit value 3 (this information is only issued when using a DCP protocol)	0.03 ... 3.20 m/s	0.50
LIFT_NO	Enter the lift number	1 ... 2	1
NODE_ID	Node number, normally: Control system: 1 ZAdyn4Bplus: 2 Encoder: 4	1 ... 128	2
BD_RATE	Bitrate	10 kBd ... 250 kBd	250 kBd
T_CMD	Maximum waiting time for commands of the control system	200 ... 3000 ms	1500 ms
SIM_V1	<b>ON:</b> Distance-dependent delay of V3 -> V1 or V2 -> V1 is carried out if V1 is activated 100 ms after switching off V3 or V2 at the latest SIM_V1 must be activated to carry out a distance-dependent delay of V3 -> V1 or V2 -> V1 with binary speed specification <b>Off:</b> Distance-dependent delay of V3 -> V1 or V2 -> V1 is only carried out if the positioning speed is already activated at the time of deactivation of a high travelling speed (V3 or V2)	On Off	Off  in the case of Config="32:-S_Smart": On
A_MAX	Delay in elevator emergency stop due to deactivation of the input with the function "/DELAY"	0.2...2.55m/s <sup>2</sup>	1.00 m/s <sup>2</sup>
S_B_OFF	Additional braking offset	0 ... 160 mm	50



## Parameter descriptions for digital inputs

Parameter	Function	Explanation
<b>00:Free</b>	Function not assigned	Activating the input is noneffective
<b>01:RF</b>	Controller enable	Enabling the ZAdyn4Bplus. The input must be activated during the entire journey.
<b>02:RV1</b>	Direction preset UP	Travel direction "UP"
<b>03:RV2</b>	Direction prest DOWN	Travel direction "DOWN"
<b>04:V1</b>	Positioning speed	Speed to position the car to the stop point
<b>05:V2</b>	Intermediate speed	If necessary, the intermediate speed for normal travel
<b>06:V3</b>	travel speed	High travel speed for normal travel
<b>07:VZ</b>	Readjustment speed	Speed for readjustment. Has precedence above all other speeds!
<b>08:V4</b>	Additional speed 1	Additional speed for inspection and return operation
<b>09:V5</b>	Additional speed 2	Additional speed for inspection and return operation
<b>10:V6</b>	Additional speed 3	Additional speed for inspection and return operation
<b>11:V7</b>	Additional speed 4	Additional speed for inspection and return operation
<b>12:PARA2</b>	Switchover to 2nd parameter set	2nd parameter set is activated
<b>13:BIN0</b>	Binary input 0	Speed default through binary coding Standard-configuration
<b>14:BIN1</b>	Binary input 1	Speed default through binary coding Standard-configuration
<b>15:BIN2</b>	Binary input 2	Speed default through binary coding Standard-configuration
<b>16:DIR</b>	Direction	Default for direction of travel when using one input 1 signal: Direction of travel "UP" 0 signal: Direction of travel "DOWN"
<b>17:v=0</b>	Hold speed 0	When the motor brake is open, speed 0 is controlled
<b>18:RF+RV1</b>	Controller enable + travel direction UP	Controller enable and travel direction "UP" are triggered with one input
<b>19:RF+RV2</b>	Controller enable + travel direction DOWN	Controller enable and travel direction "DOWN" are triggered with one input
<b>20:BR1</b>	Brake monitoring 1	Brake monitoring with unsing the input terminal X-IN
<b>21:BR2</b>	Brake monitoring 2	Brake monitoring with unsing the input terminal X-IN
<b>22:BR3</b>	Brake monitoring 3	Brake monitoring with unsing the input terminal X-IN
<b>23:BR4</b>	Brake monitoring 4	Brake monitoring with unsing the input terminal X-IN
<b>24:XBIN0</b>	Binary input 0 Free binary assignment	Speed default through binary coding Free binary assignment
<b>25:XBIN1</b>	Binary input 1 Free binary assignment	Speed default through binary coding Free binary assignment
<b>26:XBIN2</b>	Binary input 2 Free binary assignment	Speed default through binary coding Free binary assignment
<b>27:MBIN0</b>	Binary input 0 Configuration Masora	Speed default through binary coding Configuration Masora
<b>28:MBIN0</b>	Binary input 1 Configuration Masora	Speed default through binary coding Configuration Masora
<b>29:MBIN0</b>	Binary input 2 Configuration Masora	Speed default through binary coding Configuration Masora
<b>30:STANDBY2</b>	Standby 2	Switching the ZAdyn4Bplus to Standby 2 function to save energy
<b>31:STEP+</b>	Touch mode for special applications	Positive change
<b>32:STEP-</b>	Touch mode for special applications	Negative change
<b>33:PFU_BR</b>	BR monitoring for option PFU+BR	Functional monitoring of brake resistor when using a brake resistor in conjunction with power recuperation unit
<b>34:HY_UP</b>	Direction UP at hydraulic elevator with Bucher aggregate type Saturn ALPHA	The input functions RF+RV1+V1 are activated simultaneously when the input is activated only in ZAdyn HY

Parameter	Function	Explanation
35:HY_DOWN	Direction DOWN at hydraulic elevator with Bucher aggregate type Saturn ALPHA and Orion ALPHA	The input functions RF+RV2+V1 are activated simultaneously when the input is activated only in ZAdyn HY
36:/FastStp	Delay in emergency stop	When deactivating the input the motor is braked with the delay set in the "Control System/A_MAX" menu
37:DTE	Ziehl-Abegg test function	Reserved for Ziehl-Abegg
38:RECORD	Recorder function	Start or stop measurement by external signal <b>Input activated:</b> Measurement is active <b>Input deactivated:</b> Measurement is stopped and saved
39:INV_A1	Direction UP at hydraulic elevator with Bucher aggregate type Orion ALPHA	Inverting the analog target value A1
40:FKT.ana	Ziehl-Abegg test function	Reserved for Ziehl-Abegg
41:Monitor	Monitoring function for manually evacuation	Shown evacuation direction and evacuation speed
42: LZ	Distance-dependent deceleration after standstill	With active input there is a deceleration after speed 0, even when travel speeds are activated. The deceleration from travel speed V1 depends on the distance programmed for the parameter S_10.
43:STANDBY 1	Standby 1	Switching the ZAdyn4Bplus to Standby 1 function to save energy
44: ZR_RDY	ZArec ready	ZArec monitoring function
45: /ESC	/ESC	Electronic short-circuit is deactivated
46:SBC_RDY	ZAsbc4C ready	ZAsbc4C monitoring function
47:CO	Function not assigned	
48: EVA act.	Display: Battery evacuation active	If switching to battery supply takes place during travel, this input function must be set.
49: MOT_TEMP	External motor temperature monitoring	If an external device is used for monitoring the motor temperature, this input function can be used to display overtemperature of the motor.
50: RF+V1	Controller enable and positioning speed	Enable for the ZAdyn and speed for positioning the car at the stop

#### Parameter descriptions for digital outputs

Parameter	Function	Explanation
Off	Output has no function	Output is open all the time
RB	Controller ready Switching the motor contactors Activating the inputs of the STO function	Contact closes when the following signals are present: Controller enable, travelling speed and direction specification. When closing the contact, the inputs of the STO function must be activated without delay or the motor contactors connected.
/RB	Inverted function of "RB contactor"	Contact opens when the following signals are applied: Controller enable, traveling speed and direction.
V<V_G1	Speed monitoring	Contact opens when the limit value V_G1 set in the "Control System" menu is exceeded.
V<V_G2	Speed monitoring	Contact opens when the tolerance set in the "Control system" menu V_G2 is exceeded.
V<1.1*V_3	Speed monitoring	Contact opens when the traveling speed V3 is exceeded by 10%.
Warning	Caution!	Monitoring of the motor temperature (for ZAdyn4) and the temperature of the power section. Contact opens if a malfunction advance warning is present because of an excess temperature. The current trip will be traveled to the end. The advance warning can be evaluated by the open loop control and a new start can be prevented.
Fault	Fault	Contact is closed if no error is present in the ZAdyn4Bplus.

Parameter	Function	Explanation
<b>Evac.Dir.</b>	Evacuation direction	Contact open: Car is lighter than counterweight Contact closed: car is heavier than counterweight
<b>MB_Brake</b>	Mechanical brake	Contact closes after expiration of the magnetic flux creation time. When the contact close, the mechanical brake must be immediately opened via an external contactor.
<b>/V&lt;V_G1</b>	inverted function of "V<V_G1"	Contact closes when the limit value set in the "Control system" menu V_G1 is exceeded.
<b>/V&lt;V_G2</b>	Inverted function of "V<V_G2"	Contact closes when the limit value set in the "Control system" menu V_G2 is exceeded.
<b>V=0</b>	Speed = 0	Contact opens at start of travel, when actual speed > 0 m/s Contact closes at the end of travel when actual speed = 0 m/s and output for control mode contactor = 0
<b>PFU</b>	Recuperation unit	Switching the feedback unit to standby function to save energy
<b>Suspension means</b>	Suspension means replacement necessary	Contact closes if the current suspension means can be used for approx. 1 more year. Contact stays close until the down-counter will be reset.
<b>TD_CNText.</b>	Monostable trigger circuit	The output relay gives an impulse to the output at every travel direction change. For connecting an external counter, e.g. in the control system
<b>Full load</b>	Full load	Contact closes when motor current is exceeded for 200 ms during constant travel
<b>SD</b>	Speed monitoring	<b>Closed Loop operation:</b> Output becomes active when deceleration from V3 actual speed < limit value V_G1. <b>Open Loop operation:</b> Output becomes active when deceleration from V3 nominal speed < limit value V_G1. Output becomes inactive as soon as actual/nominal speed = 0
<b>STO-Info</b>	Status of the STO function	Contact is closed when the output stage is not blocked by the STO function (output is only information, not safety-related).
<b>/STO info</b>	Inverted function of STO info	Contact is closed when the output stage is blocked by the STO function (output is information only, not safety-related).
<b>BR Info</b>	Status of brake monitor inputs BR1...BR4	The contact is closed when the brakes are open during travel
<b>ZR_EN</b>	ZArec: Enable of ZArec4C power feedback unit	Contact closes when the following signals are present: controller enable, travelling speed and direction specification.
<b>Stutter br.</b>	Stutter brake	Contact opens if the speed of the elevator cabin exceeds the limit value configured in the parameter V_G1. Contact closes if the speed is below the limit value.
<b>MotShorts</b>	Signal for switching a motor short-circuit contactor	If an external contactor is used to short-circuit the motor, this signal can be used to switch it.
<b>EvaDisMains</b>	Signal for disconnecting the mains for emergency evacuation via battery	If the system is switched to battery operation (see input function 48:EVA act.), this output signal disconnects the mains. As soon as the system is at a standstill, the ZAdyn restarts and waits for the line voltage to be restored.
<b>P&lt;0</b>	Regenerative operation	The output is activated as soon as the ZAdyn is in regenerative operation and is no longer drawing power from the line.
<b>Fan fault [Vent Strg]</b>	Internal function of ZIEHL-ABEGG SE	Internal function of ZIEHL-ABEGG SE
<b>ZAdyn ready</b>	ZAdyn ready	The output is activated when the ZAdyn is ready to accept a travel command

**12.7 Monitoring menu**  
 Configuring the monitoring functions

Parameter	Designation	Value range	Factory setting
<b>MOD_ST</b>	Behavior of the ZAdyn4Bplus during fault <b>Block function:</b> In the event that successive serious errors are reported but an error-free run is performed, you have the option of blocking the frequency inverter. The output "ST fault" remains open. The fault counter is set to 0 when an error-free run is performed. <b>Fix 2 sec:</b> No blocking function - the output configured to "ST" drops out for 2 seconds in the event of a malfunction and then increases again <b>Lock n.3:</b> Block function after 3 malfunctions. Output "ST" remains dropped after the 3rd error <b>Lock n.2:</b> Locking function after 2 errors. The "ST" output remains de-energised after the 2nd error. <b>Lock n.1:</b> Block function after 1 malfunction. Output "ST" remains dropped after the 1st error. With the blocking function, the following message appears: "ZAdyn lock! To unlock, press OK." After pressing the "i" key, the device reverts to normal operation. The errors that led to locking are marked accordingly in the error list.	Fix 2 s Lock n.3 Lock n.2: Lock n.1	Fix 2 s
<b>STO</b>	STO function monitor <b>ON:</b> STO monitor activated <b>OFF:</b> STO monitor deactivated Monitoring of the STO function should only be deactivated when the STO function is not used and motor contactors are used instead.	ON OFF	ON
<b>LOCK_X</b>	Block at brake malfunction The ZAdyn4Bplus is locked in case of brake malfunctions if this parameter is switched on. With <b>CONFIG: 31:KL_IO</b> LOCK_X is automatically activated	ON OFF	OFF
<b>UNLOCK</b>	Lifting the block in the event of a brake malfunction. The lock is lifted in case of brake malfunctions if this parameter is switched on.	ON OFF	OFF
<b>CO</b>	Monitoring the travel contactors <b>OFF:</b> Contactor monitoring deactivated <b>CO1:</b> Contactor monitoring is only implemented by input CO1 (series connection of the monitoring contacts) <b>CO1&amp;CO2:</b> Contactor monitoring is implemented by inputs CO1 and CO2 (individual monitoring of the monitoring contacts)	OFF CO1 CO1&CO2	AUS

Parameter	Designation	Value range	Factory setting
<b>BR</b>	<p>Motor brake monitoring</p> <p>Input of number and function of the brake monitoring contacts used</p> <p><b>OFF:</b> No brake monitoring connected</p> <p><b>1*NC:</b> 1x normally closed contact (Contact closed when brake currentless)</p> <p><b>2x NC:</b> 2x Normally closed contact (contact closed when brake is currentless)</p> <p><b>3x NC:</b> 3x Normally closed contact (contact closed when brake is currentless)</p> <p><b>1*NO:</b> 1 x normally open (contact is open when brake currentless)</p> <p><b>2x NO:</b> 2x Normally open contact (contact open when brake is currentless)</p> <p><b>3x NO:</b> 3x Normally open contact (contact open when brake is currentless)</p> <p><b>4*NC:</b> 4 x normally closed contact (Contact closed when brake currentless)</p> <p><b>4*NO:</b> 4 x normally open (contact is open when brake currentless)</p> <p><b>1xNC+1xNO:</b> 1x NC contact (BR1) and 1x NO contact (BR2)</p>	<p>Off</p> <p>1*NC</p> <p>2*NC</p> <p>3*NC</p> <p>1*NO</p> <p>2*NO</p> <p>3*NO</p> <p>4*NC</p> <p>4*NO</p> <p>1*NC+1*NO</p>	accordingly to motor type
<b>P1P2</b>	<p>Motor temperature monitoring</p> <p><b>OFF:</b> Temperature monitoring deactivated</p> <p><b>PTC:</b> thermistor (PTC according to DIN 44082)</p> <p><b>TC:</b> Thermal circuit breaker</p> <p><b>KTY:</b> Temperature sensor KTY84-130</p> <p><b>Pt100:</b> Temperature sensor Pt100</p> <p><b>Pt1000:</b> Temperature sensor Pt1000</p>	<p>Off</p> <p>PTC</p> <p>TC</p> <p>KTY</p> <p>Pt100</p> <p>Pt1000</p>	PTC
<b>T_P1P2</b>	<p>Only accessible if the <b>P1P2</b> parameter is configured to "KTY", "PTC", "Pt100" or "Pt1000"</p> <p>Trigger temperature for motor temperature monitoring</p>	50...180°C	130°C
<b>T_ENC</b>	<p>Rotary encoder monitoring</p> <p>Time starts with an output of the "MB" output signal. If no rotary encoder input signals occur during this time, the frequency inverter enters error mode</p>	0.5 ... 7.0 s	2.0
<b>T_CO</b>	<p>Debounce time of the motor contactor monitoring</p> <p>Monitoring time of the contactor interruption. The final stage is switched off when the contactor contacts are open for longer than the time set in the T_CO parameter. The time T_CO is active in interruptions during travel, not in a normal stop. Only accessible when contactor monitor is activated.</p>	<p>0.00 ... 100.0 ms</p> <p>0.00=Off</p>	10 ms
<b>T_CDLY</b>	<p>Delay contactor monitor</p> <p>When the contactor monitor is switched on (menu "Monitoring/-CO") the reply must be available at the contactor monitor input within the time T_CDLY for the motor contactors to be closed (start up) or open (stop).</p>	0.5 ... 7.0 s	1.5 s
<b>T_BR</b>	<p>Debounce time for brake monitoring. The input signal is evaluated delayed by the time T_BR. Only accessible if the brake monitoring is activated.</p>	0.01 ... 3.00 s	0.1
<b>S_MB</b>	<p>Maximum distance with MB=Off</p> <p>If rotary encoder impulses are detected when the digital output "MB" is switched off, the frequency inverter issues an error message if the configured path is exceeded.</p>	0.10 ... 1.00 m	0.10
<b>I_MAX</b>	<p>Protection against overload current depending on the nominal current of the motor</p> <p>If the configured value for "I_MAX" is exceeded for the time "T_I_MAX", the frequency inverter issues an error message.</p>	20 ...180 %	130

Parameter	Designation	Value range	Factory setting
T_I_MAX	Overcurrent protection If the value configured in "I_MAX" (l x "I_MAX") is exceeded for the time "T_I_MAX", the frequency inverter issues an error message.	0.3 ... 10.0 s	5.0
MASK1	Error mask 1...5 Suppression of up to five error messages through configuring the corresponding error number in an error mask	Error no.	0
MASK2			0
MASK3			0
MASK4			0
MASK5			0
MSK_NEG	Negative error screen Inactive errors are activated by configuring the corresponding error numbers	Error no.	0

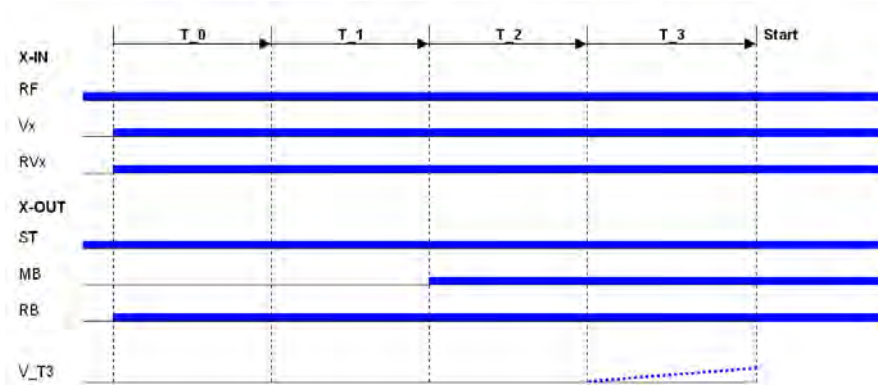
## 12.8 Start menu

Chronological sequence from before the start of acceleration and optimization of the start-up behavior.

Parameter	Designation	Value range	Factory setting
M_START	Control action to optimize the starting behavior (see chapter "Commissioning") <b>Off:</b> RPM control without gain at start (K_Start=1) <b>MOD1:</b> Speed control <b>MOD2:</b> Speed control + safety function <b>MOD3:</b> Speed + position control <b>MOD2:</b> Position control + safety function <b>MOD5:</b> Position control	Off MOD1 MOD2 MOD3 MOD4 MOD5	accordingly to motor type
K_START	Start gain Multiplication factor for the parameter "Controller/SPD_KP" or amplification of the position controller (dependent on the start-up mode)	is automatically limited	1.0
T_0	Max. motor contactor switch-on time Time during deactivated contactor monitoring ("Monitoring/CO=-Off" menu) from applying the travel signal up to supplying the motor with current	0.0 ... 10.0 s	0.5
T_0 real	Measured time that the contactors require to open	Cannot be set	0.0
T_1	Flux build-up time Time to build up a magnetic field in the motor (asynchronous motors only) <b>A</b> The parameter T_1 is only visible for operation with asynchronous motors.	<b>A</b> 0.1 ... 10.0 s <b>S</b> Value set to 0.0	<b>A</b> 0.1
T_2	Maximum brake opening time After expiration of time "T_1", the brake must have opened within time "T_2"	0.0 ... 15.0 s	<b>S</b> 1.8, for MOT_- TYP=SM250: 2.5 <b>A</b> 0.6
T_2 real	Measured time that the brake requires to open	Cannot be set	0.0
T_3	Hold speed V_T3 Within time T_3, the machine accelerates up to the speed configured in V_T3	0.0 ... 20.0 s	0.0
V_T3	Minimal speed to minimize starting jerk. Within time T_3, the machine is accelerated up to speed V_T3, thus overcoming the static friction.	0 ... 100 mm/s	0

Parameter	Designation	Value range	Factory setting
s_start	If the position of the machine changes during the start procedure by the configured value, amplification K_START is switched off (only with M_START=MOD2/4)	0.1 ... 30 mm	3.0
BRK_DMP	Brake damping	AUS EIN	EIN

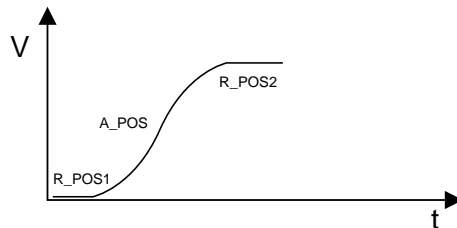
### Start-up time sequence



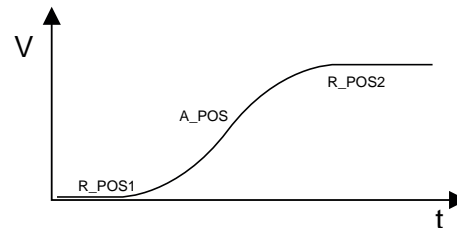
## 12.9 Acceleration menu

Definition of acceleration ramp.

Parameter	Designation	Value range	Factory setting
A_POS	Positive acceleration	0.12 ... 2.00 m/s <sup>2</sup>	0.5
R_POS1	Lower round off during positive acceleration, a higher value causes a softer round off	5 ... 90 %	will be calculated
R_POS2	Upper round off during positive acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated



Acceleration with high A\_POS and low R\_POS1 and R\_POS2



Acceleration with low A\_POS and high R\_POS1 and R\_POS2

## 12.10 Travel menu

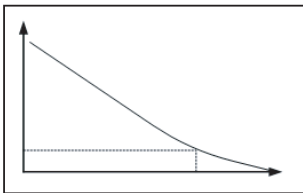
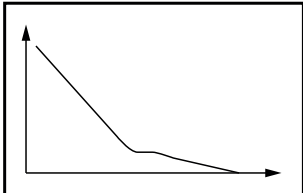
Traveling speed defaults

Parameter	Designation	Value range	Factory setting
V_1	Positioning speed Speed to position during floor approach	0.010 ... 0.20 m/s	0.050
V_2	Intermediate speed Speed for normal traveling e.g. during travel to intermediate floor	0.03 ... 6.50 m/s	0.50
V_3	High travelling speed Speed for normal travel	0.03 ... 10.00 m/s	0.95

Parameter	Designation	Value range	Factory setting
V_Z	Readjustment speed Speed for readjusting the car position during car loading or unloading	0.003 ... 0.30 m/s	0.01
V_4	Additional speed	0.03 ... 3.50 m/s	0.30
V_5	Additional speed	0.03 ... 3.50 m/s	0.30
V_6	Additional speed	0.03 ... 3.50 m/s	0.05
V_7	Additional speed	0.03 ... 3.50 m/s	0.05

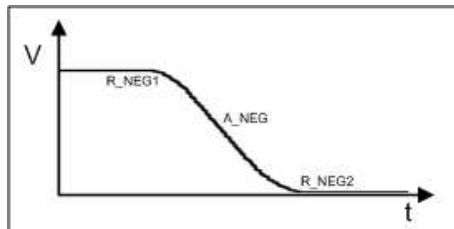
### 12.11 Decelerating menu

Defines the deceleration ramp and optimizes the positioning behavior.

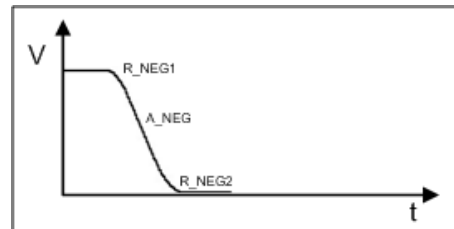
Parameter	Designation	Value range	Factory setting
A_NEG	Negative acceleration	0.12 ... 2.00 m/s <sup>2</sup>	0.5
R_NEG1	upper round off during negative acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
R_NEG2	lower round off during negative acceleration, a higher value causes a softer round off	20 ... 90 %	will be calculated
S_DI3	Dist. correction V3 Travelling speed V_3 is switched off, delayed by the configured value	0.00 ... 2.00 m	0
S_DI2	Dist. correction V2 Travelling speed V_2 is switched off, delayed by the configured value	0.00 ... 2.00 m	0
S_DI1	Dist. correction V1 Travelling speed V_1 is switched off, delayed by the configured value	0 ... 150 mm	0
S_ABH	<p><b>OFF:</b> For standard, DCP1 or DCP3 and CANopen lift (Velocity mode) control: time-dependent deceleration, deceleration paths can vary.</p> <p><b>On (V2_7):</b> Distance-dependent deceleration, time-optimised engagement. The setting is effective at all travelling speeds.</p> <p><b>On (V2_3):</b> Distance-dependent deceleration, time-optimised engagement. The setting is effective at travelling speeds V_2 and V_3.</p>  <p>Distance-dependent deceleration, time-optimised engagement.</p> <p><b>Slow:</b> Distance-dependent deceleration, landing with early reduction of levelling speed</p>  <p>Distance-dependent deceleration, landing with early reduction of levelling speed</p>	<p>Off</p> <p>On (V2..7)</p> <p>Slow</p> <p>On (V2..3)</p>	On (V2..3)



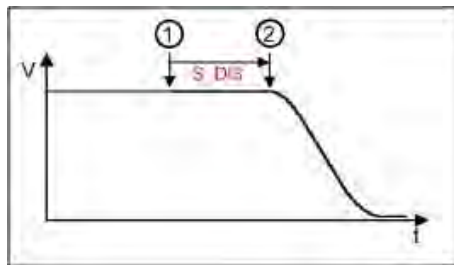
Parameter	Designation	Value range	Factory setting
DCP_FIL	<p>DCP filter type</p> <p><b>Off:</b> Function deactivated</p> <p><b>Opt.4:</b> Function not assigned</p> <p><b>Opt.3:</b> Function not assigned</p> <p><b>Opt.2:</b> Function not assigned</p> <p><b>Opt.1:</b> Travel behaviour is optimised during deceleration (for DCP4 only)</p> <p>Where the use of DCP_FIL = Opt. 1 is recommended, the message "DCP cycle time! (DCP_FIL = Opt.1 ?)" [Zykluszeit DCP! (DCP_FIL = Opt. 1 ?)] is displayed at the end of travel.</p> <p>The parameter is only displayed with DCP actuation.</p>	<p>Off</p> <p>Opt.4</p> <p>Opt.3</p> <p>Opt.2</p> <p>Opt.1</p>	Off



Deceleration with low A\_NEG and high R\_NEG1 and R\_NEG2



Deceleration with high A\_NEG and low R\_NEG1 and R\_NEG2



Function S\_DI  
1 Switching of V3  
2 Starting with deceleration

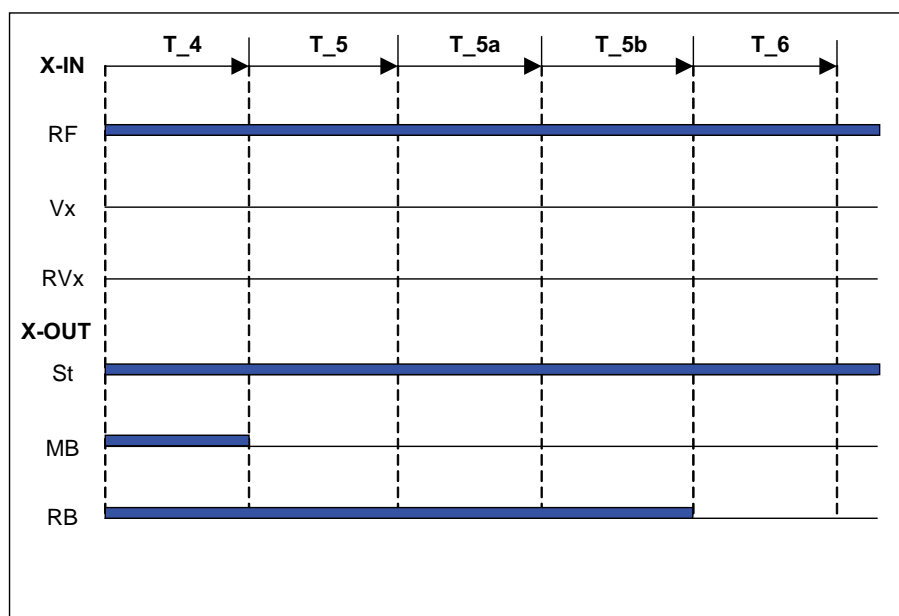
## 12.12 Stop menu

Chronological sequence after reaching speed 0 during stopping procedure.

Parameter	Designation	Value range	Factory setting
T_4	Hold speed 0 During time T_4, the motor is maintained at speed 0 after reaching this speed	0.0 ... 10.0 s	0.1
T_5	Mech. Brake close time Time within which the mechanical brake must be closed	0.0 ... 10.0 s	<p><b>A</b></p> <p>0.6</p> <p><b>S</b></p> <p>1.5, in the case of MOT_- TYP=SM250: 2.0</p>
T_5a	<b>S</b> additional current feed at closed brakes	0.0 ... 2.0 s	0.0
T_5b	<b>S</b> Wait until the motor is currentless Within time T_5b, the powering of the synchronous motor is decreased in a ramp function	0.0 ... 2.0 s	0.3

Parameter	Designation	Value range	Factory setting
T_6	Wait until contactors open Time within which the contacts of the motor contactors must be opened	0.0 ... 10.0 s	0.5

### Stopping time sequence



### 12.13 Controller menu

Influences the speed control by the factor of the basic amplification (SPD\_KP) and readjustment time (SPD\_TI).

Selecting the control mode of the ZAdyn4Bplus.

Parameter	Designation	Value range	Factory setting
SPD_KP	Multiplication factor to modify the calculated basic amplification SPD_C	is automatically limited	1.00
SPD_TI	Adjusting time Controller averaging time during the trip	5 ... 500 ms	100
IQ_KP	Current controller basic gain	0.1...127	1.5
IQ_TI	Current controller adjustment time	1...50 ms	15 ms
NF	<b>S</b> Noise filter This parameter activates a noise filter that enables noise caused by the motor to be reduced (synchronous motors only).	Off On	Off
NF_F1	<b>S</b> Filter-Freq.1: Number of slots Enter the number of slots on a synchronous motor (synchronous motors only).	0...1018	0



#### Information

The parameters required for open loop operation (encoderless operation) are only displayed in open loop operation. The parameters are described in the “Open loop operation (encoderless operation)” chapter.

### 12.14 Parameter set 2 menu

A second parameter set can be stored in the frequency inverter. This can be used for:

- Emergency evacuation
- Normal travel with changed parameter values
- Parameter back-up


Parameter	Designation	Value range	Factory setting
f_PARA2	Function allocation of parameter set 2 <b>Locked:</b> 2nd parameter set is blocked <b>2nd parameter set:</b> Activation of 2nd parameter set <b>EVAC 3:</b> Emergency evacuation with evacuation module EVAC 3 <b>EVA. 3*AC:</b> Emergency evacuation through three-phase current emergency-generator <b>EVA. 1*AC:</b> Emergency evacuation with UPS <b>USV:</b> Emergency evacuation by UPS with reduced power <b>EVA.&gt;=110:</b> Emergency evacuation with feed via the DC+/DC-pins at connection terminal X2 (only on ZAdyn4Bplus)	Locked 2nd parameter set EVAC 3 EVA. 3*AC EVA. 1*AC USV EVA.>=110	Locked
U_ACCU	Accu nominal voltage Configuring the rated voltage of the rechargeable battery during evacuation with evacuation unit EVAC 3 ("f_PARA2=EVAC 3B", see "Emergency evacuation" chapter)	115 ... 565 V	120
P_UPS	Max. Load UPS Configuring the available power of the UPS during evacuation with UPS ("f_PARA2=UPS", see "Emergency evacuation" chapter)	0.0 ... 70.0 kW	1.0
R_U20	Stator resistor Enter the resistor of the stator of the motor with "f_PARA2=UPS"	0.00 ... 10.00 Ohm	1.00
STOP	Stop function to improve the positioning accuracy in the evacuation mode "f_PARA2=UPS" <b>ON:</b> - Brake is closed when the switch point for V_1 is closed. - Brake is closed when the residual path configured in S_STOP has been reached (only for DCP02/04) <b>OFF:</b> Stop function deactivated	On Off	Off
Copy	Copy parameter <b>OFF:</b> Function deactivated <b>PARA1-&gt;2:</b> copies the data from 1st parameter set into the 2nd parameter set	Off Para 1->2	Off

**12.15 Statistic menu**

All statistical data can be called up in the **Statistics** menu. The data will be retained even after the ZAdyn4Bplus has been switched off. Reading out the error list and deleting the error memory are described in the chapter "Error diagnosis".

**Information**

Not all parameters are visible when the **Statistic** menu is opened in the basic level.

Parameter	Designation	Value range	Factory setting	visible in the basic level
ST_LST	Error list	Cannot be set	-	X
ST_H	Operating hours	Cannot be set	-	X
ST_DRV	Number of trips	Cannot be set	-	X
ST_HDRV	Number of travel hours	Cannot be set	-	X
ST_UC	Usage category in accordance with VDI 4707	Cannot be set	-	X
ST_RES	Number of mains interruptions	Cannot be set	-	X
ST_SRF	Number of travel aborts due to interruption of the controller enable RF during the travel	Cannot be set	-	X
ST_SXO	Number of travel interruptions due to interruption of the STO or CO input signal during travel operation	Cannot be set	-	X
ST_CLR	Delete error memory Deletes ST_LST, ST_RES and ST_SRF and ST_SCO	On Off	Aus	
CRC_SAF	Shows a checksum for the set values of the safety-related parameters BR, STO and TD_RES	Cannot be set	-	X
APD	Automatic parameter diagnosis, see "Error diagnosis" chapter <b>On:</b> Automatic parameter diagnostics is activated <b>Off:</b> Automatic parameter diagnostics is deactivated	On Off	Off	
RESET	Deletes parameters, counter levels and error lists, preassigning parameters with standard values. <b>77:</b> <b>Pre-parametrised ZAdyn4Bplus:</b> Parameters are assigned customer-specific system data <b>Standard ZAdyn4Bplus:</b> Parameters are assigned standard data <b>90:</b> Device reset, parameters are deleted and set to factory settings. ENC_OFF is retained. <b>99:</b> Device reset, parameters are deleted and set to factory settings. ENC_OFF is deleted.  If a value is entered for the rotary encoder offset (ECOFF), it will also be deleted!	77 90 99	0	X
TD_PWN	Assign password for the travel direction counter. A number between 0 and 9999 can be used as a password 0 = no password	0 ... 9999	0	
TD_PWC	Displays the password in coded form. If you lose the password, please contact the manufacturer.	nicht einstellbar	21689	
TD_PW	Enter password.	0 ... 9999	0	
TD_SET	Initial value of the down counter If the start value of the down counter is set to 0.00, the down counter is deactivated.	0.00 ... 16.67 M	0.00	
TD_RST	Restore the counter level from the rotary encoder	On Off	Off	

## 12.16 Memory Card menu

Contains the parameters for the various functions in association with a memory card.



### Information

Not all parameters are visible when the **Memory Card** menu is opened in the basic level.

Parameter	Designation	Value range	Factory setting	visible in the basic level
SAV_ALL	Saves data to memory card with serial number allocation <ul style="list-style-type: none"> <li>Parameter list (.PRT) in folder /4CX/DEVICE/[Serial number]/LST</li> <li>Error list (.FLT) in folder /4CX/DEVICE/[Serial number]/LST</li> <li>Parameters (.PA3) in folder /4CX/DEVICE/[Serial number]/-PAR</li> <li>Black box (.BOX) in folder /4CX/DEVICE/[Serial number]/LST</li> </ul> <b>Off:</b> no function <b>ON:</b> Data will be saved to the memory card. After copying, the parameter jumps back to "Off"	On Off	Off	X
SAV_PAR	Save parameters to memory card (copy parameters in the case of identical systems): <ul style="list-style-type: none"> <li>Parameter (.PA4) in directory /4CX/DEVICE/FORCE</li> </ul> Here, there is no serial number allocation. The data will be overwritten during each saving <b>Off:</b> no function <b>ON:</b> Parameter will be saved to the memory card. After copying, the parameter jumps back to "Off"	On Off	Off	X
LOD_PAR	Load parameters from memory card to frequency inverter (copy parameters in the case of identical systems) <b>Input 27:</b> Parameters (.PA3) are loaded to the frequency inverter from the /4CX/DEVICE/FORCE directory. The parameter switches to "Off" again after loading	27	0	X
UPDATE	Entry for codes created depending on the ZAdyn serial number and firmware version.	0...65535	0	
SAV_CFG	Saves data to memory card with configuration number allocation: <ul style="list-style-type: none"> <li>Parameter list (.PRT) in directory /4Cx/CONFIG/configuration</li> <li>Parameter (.PA3) in directory /4CX/CONFIG/configuration number</li> </ul>	0 ... 65535	0	
LOD_CFG	Load parameters from memory card to frequency inverter by specifying the configuration number <b>Enter configuration number:</b> Parameters (.PA3) are loaded to the frequency inverter from the /4CX/CONFIG directory. The parameter switches to "Off" again after loading	0 ... 65535	0	
DIR_NUM	Directory number Assigned number under which the directory is saved on the memory card. If "0" is entered, the serial number of the frequency inverter is used as the directory name.	0 ... 65535	0	
Format	Reformatting the memory card: <b>Input 27:</b> Folders and files on the memory card are deleted	27	0	

### 12.17 MMC-Recorder menu

You have the option of performing measurements on the ZAdyn4Bplus using a memory card without the need for a notebook. The measurement is configured in the **MMC recorder** menu.

Parameter	Designation	Value range	Factory setting
REC_MOD	Recorder settings <b>Off:</b> Recorder is switched off <b>ON:</b> Recorder is active, the operating curves are saved to the memory card <b>Stop&amp;Shot:</b> Manual stopping and saving of a measurement which was started with MOD=ON". After saving the data on the memory card, REC_MOD will set to "Off". <b>ZAmon:</b> Mode for using ZAmon software The settings for REC_MOD can only be changed with REC_CFG=0.	Off On Stop&Shot ZAmon	Off
REC_CFG	Configuring the measurement channels <b>0:</b> All measuring channels and the recording time can be freely configured <b>1 ... 9:</b> Permanently set configurations that cannot be modified <b>20:</b> Configuration for HY operation	0 1 2 3 4 5 6 7 8 9 20	1
TRIG_BY	Trigger-source Specifications for stopping the recorder and saving the data to the memory card. <b>Error:</b> Data is saved as soon as an error occurs <b>Err/stop:</b> data will be saved as soon as an error occurs or an error-free travel is finished <b>Cont.:</b> Function is not used <b>Interval:</b> Function is not used <b>Ext.Input:</b> Function is not used	Error Error/Stop Cont. Interval Ext.Input	1.0
T_REC	Record-time Time for a measurement with 1024 measured values For a recording time of 5 s, for example, measured values are recorded every 5 ms	5 s 10 s 15 s 20 s 40 s 80 s 160 s 0.5 h 1 h 24 h	5
T_DLY	Trigger Delay Delay time for stopping of the measurement, e.g. T_DLY=0.5s: the recording will be stopped 0.5s after an error occurs.	0.5 s	0.5 s

Parameter	Designation	Value range	Factory setting
CHN1	Configuration of the measuring channels 1-4 with analog measurement values 1: Setpoint for travelling speed [m/s] 3: actual speed [m/s] 6: Internal status (frequency inverter status) 16: flux build-up current [A] 26: motor current [A] 27: motor voltage [V] 31: temperature power section [°C] 49: covered total travel distance [m] 62: residual path by the control system [mm] (only with DCP2 or DCP4) 119: Capacity of the Brake-Chopper / Brake resistor 142: Intermediate circuit voltage [V] 143: torque build-up current [A] 213: Remaining distance specification 214: Braking distance 215: Target speed	0...299	3
CHN2			1
CHN3			143
CHN4			6
CHN5	Configuration of the measuring channel 5 with digital measurement values 89: digital in- and outputs with indication of the function 90: digital in- and outputs optimized for brake monitoring 91: digital in- and outputs 92: DCP command and status bits 118: CAN bits in Velocity mode 137: CAN bits in Position mode	0...299	89

## 12.18 Encoder adjustment menu



Contains parameter values required for aligning the absolute value encoders for synchronous motors.

The procedure for entering the encoder alignment data is described in the "Special functions" chapter.

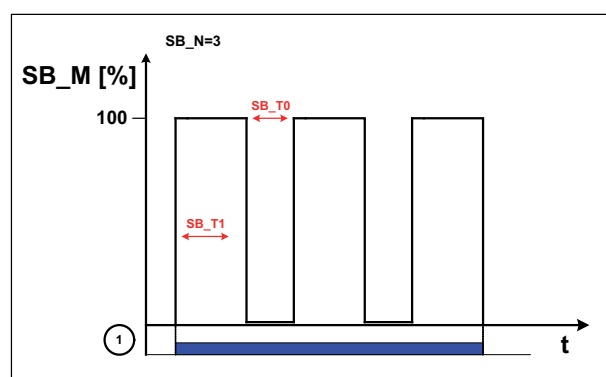
Parameter	Designation	Value range	Factory setting
ENC_ADJ	Activating the encoder alignment <b>Off:</b> no function <b>Check:</b> Activates load-free rotary encoder adjustment check <b>Load-free:</b> Activates load-free rotary encoder adjustment <b>Braked:</b> Activates rotary encoder adjustment with closed brake <b>Mag.Adhesion:</b> Start magnet adhesion process for operation with Kone EcoDisc type drives. <b>Mag.Exist.:</b> Enables replacement of the ZAdyn without carrying out the magnet adhesion process again with Kone EcoDisc type drives.	Off Check No load Braked Mag.Adhesion Mag.Exist.	Off
ENC_POS	Encoder Position Numerical display of the absolute position of the rotary encoder per revolution: 0 to [4x number of pulses in rotary encoder] rpm	Cannot be set	-
ENC_OFF	Correction value for encoder offset When performing rotary encoder adjustment with a closed brake, the offset value is saved in this parameter.	0 ... 360.00°	0

Parameter	Designation	Value range	Factory setting
<b>SAV_P_E</b>	Storing of data in the absolute value encoder via the "Electronic rating plate" function (only possible with EnDat or Hiperface absolute value encoders) <b>ON:</b> Data from the ZAdyn4Bplus are filed in the absolute encoder <b>Off:</b> Function deactivated	On Off	Off
<b>LOD_P_E</b>	Reading of data from the absolute value encoder via the "Electronic rating plate" function (only possible with EnDat or Hiperface absolute value encoders) <b>Input 27:</b> Data are read out from the absolute encoder into the ZAdyn4Bplus	0...65535	0

### 12.19 Safety gear menu

Configuration of the data used for the "Safety gear" function.  
 The procedure for the safety brake is described in the "Special functions" chapter.

Parameter	Designation	Value range	Factory setting
<b>SB_MOD</b>	Activate or deactivate the capture release <b>OFF:</b> Capture release is deactivated <b>On:</b> Starting the Safety-Brake-function in the requested direction by pressing the button "Inspection trip UP" oder "Inspection trip DOWN"	On Off	Off
<b>SB_M</b>	Default for pulse amplitude with which the motor is to be fed with current. The default is calculated as a percentage of the maximum operating current of the frequency inverter (nominal current x 1.8)	1 ... 100 %	70
<b>SB_T0</b>	Pulse breake Break time between the individual current pulses	0.1 ... 2.0 s	0.2
<b>SB_T1</b>	Împulse time Time for which the motor will be fed with current	0.1 ... 1.0 s	0.5
<b>SB_N</b>	Number of current pulses	1 ... 5	3



Process capture release  
 1 Inspection trip "UP" or "DOWN"



### 12.20 HW-Ident. menu

Identifying the individual assemblies of the ZAdyn4Bplus. The identification of the assembly is generally read out directly from its EEPROM.

Parameter	Designation	Value range	Factory setting
ID_NOK	The number of the changed hardware identification (identification-no. unequal 0) is indicated		

### 12.21 Power section menu

Configuring the tolerances of the internal power stage.

Parameter	Designation	Value range	Factory setting
M_PWM	Pulse width modulation operating mode <b>Auto:</b> PWM frequency is changed depending on the power stage temperature and load. At the start of travel, the motor voltage is cycled at the cycle frequency set in parameter "f_PWM_H". Cycle frequency is reduced if required. <b>Fix f_PWM:</b> motor voltage is permanently cycled at the PWM frequency set in the parameter "f_PWM"	Auto Fix f_PWM	ZAdyn 011-040: Auto  ZAdyn 050-074: <input type="checkbox"/> Asynchronous motors: Auto <input type="checkbox"/> Synchronous motors: Fix f_PWM  ZAdyn 110-220: Auto
f_PWM	Cycle frequency at parameter setting "M_PWM=Fix f_PWM"	ZAdyn 011-074: 3.7 ... 10.0 kHz  ZAdyn 110-220: 3.7 ... 8.0 kHz	ZAdyn 011-074: 8.0  ZAdyn 110-220: 3.7
f_PWM_H	Maximum cycle frequency (start frequency) at parameter setting "M_PWM=Auto" Parameter is only shown for "M_PWM=Auto".	ZAdyn 011-074: 5.0 ... 16.0 kHz  ZAdyn 110-220: 5 ... 8.0 kHz	ZAdyn 011-074: 16.0  ZAdyn 110-220: 7.4
UDC_N	DC voltage for the DC-link	100 ... 680 V	565
UDC_MIN	Minimum limit value of the DC-link voltage	90 ... 565 V	450
UDC_MAX	Maximum limit value of the DC-link voltage	100 ... 760 V	760
FAN_T	Power stage temperature at which the fan is switched on	28 ... 60 °C	50

**12.22 Menu checks**

Selection of supporting tests during acceptance of the system:

- Testing the protective device in compliance with EN81

Parameter	Designation	Value range	Factory setting
SCY_EN	Enabling of the test functions <b>On:</b> Functions are accessible <b>Off:</b> No access to the functions <b>After a test function has been performed, this parameter automatically adopts the "Off" value.</b>	On Off	Off
SCY_ENC	Rotary encoder test <b>On:</b> Failure of the rotary encoder is simulated <b>Off:</b> Function deactivated	On Off	Off
SCY_TMP	Motor temperature test <b>On:</b> Failure of the motor temperature module or overtemperature on the motor is simulated <b>Off:</b> Function deactivated	On Off	Off
SCY_A3	Testing the protective device in compliance with EN81 <b>No current:</b> Movement of the car by releasing the brakes without power to the final stage <b>max. accel.:</b> Cabin is accelerated to maximum under full power <b>Off:</b> Function deactivated	No current max. accel. Off	Off
SCY_SG	Capture device test <b>On:</b> electronic short-circuit is deactivated <b>Off:</b> Function deactivated	On Off	Off
SCY_DA	Driving capability test <b>On:</b> Travel with recovery with applied counterweight, display of cabin movement <b>Off:</b> Function deactivated  Only for CAN actuation.	On Off	Off
SCY_MB	Engine brakes test <b>On:</b> Interruption of the safety circuit, display of braking distance <b>Off:</b> Function deactivated  Only for CAN actuation.	On Off	Off

**12.23 ZA-Intern menu**

Parameterisation of internal measuring and monitoring functions

Parameter	Designation	Value range	Factory setting
PW_S9	Password for the indication of additional parameter		0
UVW_CHK	Definition of motor phase checking on start-up <b>Single:</b> The motor phases are checked during initial travel once the frequency inverter has been switched on. If the check is successful, no further monitoring is performed. If the examination is incorrect, with each start an examination is made until a correct examination could be accomplished. <b>Cont.:</b> Check is carried out before starting all travel <b>Off:</b> Motor phase check is deactivated	Single Cont Off	Single
UVW_PEK	Test voltage for motor phase check <b>1 ... 10 V:</b> Selection of the test voltage between 1 V and 10 V. In case of an error the testing voltage is displayed in the error message. <b>15 V:</b> Test voltage 15 V. <b>f(P):</b> The testing voltage depends on the nominal voltage of the motor, which is entered in the menu "Motor name plate". In case of an error the testing voltage is displayed in the error message.	1 ... 10 V 15 V f(P)	f(P)


Parameter	Designation	Value range	Factory setting
n_ANA	Initialisation value for analogue input in ZAdyn HY <b>Example:</b> n_ANA = 3000 analogue input = 0-10 V 10 V = 3000 1/min	1 ... 3300	3000



### 12.24 INFO menu


The **INFO menu** provides an easily accessible overview of:

- Current measurements
- Current operating states of the frequency inverter
- Current switching states of the inputs and outputs
- Inverter internal measurements
- Information about the internal components




The individual pages are numbered for increased clarity.

<pre>Serial-No ----- 01 ZAdynxx SN: 06128238/0001 4.42-110308xx</pre>	<p><b>Page 01: Serial-No.</b>  <b>Line 2:</b>  Display of frequency inverter type and frame size  <b>Line 3:</b>  Serial number/type consecutively numbered  <b>Line 4:</b>  Software version  Loaded 3rd operating language</p>
<pre>status ----- 02 &gt; System OFF ◀ 530→540→550→560→ 100 ^0.00 0.00 0.00m/s</pre>	<p><b>Page 02: Status</b>  <b>Line 2:</b>  current operating status in plain text display  <b>Line 3:</b>  last 5 operating statuses  current operating status is displayed on right  in total, the last 60 operating statuses can be inquired:  Previous page ◀◀  Next page ▶▶  The current condition will be indicated with the arrows &gt; &lt;  The previous conditions are indicated with the arrows &lt; &gt;  <b>Line 4:</b>  current direction of travel  current position of car in the shaft  current travel path with positioning speed  current traveling speed</p>
<pre>Dist. ----- 03 sa: 0.00 s21: 0.52m sr: ^0.00 s31: 1.45m s1: 0.00 sd: 0.52m</pre>	<p><b>Page 03: Dist</b>  <b>Line 2:</b>  sa: current position of car in the shaft  s21: calculated deceleration path V_2 → V_1  s20: calculated deceleration path V_2 → Standstill (only in DCP02/DCP04)  <b>Line 3:</b>  sr: current direction of travel, current total route  s31: calculated deceleration path V_3 → V_1  s30: calculated deceleration path V_3 → Standstill (only in DCP02/DCP04)  <b>Line 4:</b>  s1: current travel path with positioning speed V_1 (not used in DCP02 / DCP04)  sd: real deceleration path V_3 → V_1 or V_2 → V_1</p> <p>The display can be frozen by pressing the  key.</p>

<pre> Mot ----- 04 ■■■ ----- +0% real: 0rpm 0V prog: 0rpm +0.0A         </pre>	<p><b>Page 04: Mot</b></p> <p><b>Line 2:</b>          Bar chart of motor speed          [A] Slip in %          [S] Load angle in °</p> <p><b>Line 3:</b>          Actual motor speed          Motor voltage</p> <p><b>Line 4:</b>          Target motor speed          Motor current</p> <p>[A]</p> <p>If the motor has been correctly adjusted, the slip is nearly proportional to the motor's rated current (e.g. 50% motor current = 50% slip).</p> <p>The display can be frozen by pressing the  key.</p>
<pre> MotDat ----- 05 I: 11.0A n: 60rp U: 360V f:10Hz p: 10         </pre> <pre> MotDat ----- 05 I: 11.0A n: 1450rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316ms         </pre>	<p><b>Page 05: MotDat</b></p> <p>Display of the motor data entered in the "Motor name plate" menu:</p> <p>[S]</p> <p><b>Line 2:</b>          Rated current          Rated speed</p> <p><b>Line 3:</b>          Rated voltage          Rated frequency</p> <p><b>Line 4:</b>          Number of pole pairs</p> <p>[A]</p> <p><b>Line 2:</b>          Rated current          Rated speed</p> <p><b>Line 3:</b>          cos phi          Rated frequency</p> <p><b>Line 4:</b>          Magnetization current          Rotor time constant</p>
<pre> MotDatFW ----- 05 I: 11.0A n: 1560rp cos:0.89 f: 53.4Hz I0: 3.5A TR: 316ms         </pre> <pre> MotDatNom ----- 05 I: 11.0A n: 1450rp cos:0.88 f: 50.0Hz I0: 3.8A TR: 316ms         </pre>	<p><b>Page 05: MotDatFW</b></p> <p>Display of the calculated motor data with field weakening operation:</p> <p>[A]</p> <p><b>Line 2:</b>          Rated current          Rated speed</p> <p><b>Line 3:</b>          cos phi          Rated frequency</p> <p><b>Line 4:</b>          Magnetization current          Rotor time constant</p> <p><b>Page 05: MotDatNom</b></p> <p>Pressing the  key displays the original motor data</p>



<pre> RegLimits ----- 06 SP IQ ID PS U LIM:.. •. . . . . PEK:         </pre>	<p><b>Page 06: RegLimits</b>  Online display of whether a control loop has reached the limit</p> <p><b>Line 2:</b>  SP: Speed controller  IQ: Current controller (torque creation current)  ID: Current controller (flux creation current)  PS: Position controller  U: Voltage limit of the frequency inverter</p> <p><b>Line 3:</b>  Dot left: minimum limit reached  Dot right: maximum limit reached</p> <p><b>Line 4:</b>  Alarm bell left: minimum limit reached in previous journey  Alarm bell right: maximum limit reached in previous journey  No alarm bell should appear during a faultless, normal trip.</p>
<pre> Brake-Chopper ----- 07 Internal 1.4kHz BC • U_DC: _ _ _ _ _ 565V Ampl: _ _ _ _ _ 0%         </pre>	<p><b>Page 07: Brake-Chopper</b>  Online-display</p> <p><b>Line 2:</b>  Internal PWM frequency (only for brake resistor)  Condition of function and temperature monitoring on the input terminal BC (larger point = OK)</p> <p><b>Line 3:</b>  DC-link voltage as bar chart display  DC-link voltage</p> <p><b>Line 4 (only with Brake resistor):</b>  Modulation of Brake resistor as bar chart display  Modulation of Brake resistor in %</p> <p>The DC-link voltage displayed in standstill must have the value "Mains connection voltage x 1,41".</p> <p>A large point must constantly be displayed behind the function and condition monitor.</p> <p>Pressing the  button  Display will be frozen  Display of the load of the brake resistor (average value over 120s)</p>
<pre> Cu-Functions----- 08 CONFIG 00: Free I:RF RV2 V2 &gt;0.500 O:ST RB MB ... V&gt;G1         </pre>	<p><b>Page 08: Cu-Functions</b>  Online-display</p> <p><b>Line 2:</b>  Selected control system configuration in menu "Control system/CONFIG"</p> <p><b>Line 3:</b>  Active digital input functions:</p> <ul style="list-style-type: none"> <li>• Controller enable (RF)</li> <li>• Direction of travel (RV)</li> <li>• Travelling speed (V) in m/s</li> </ul> <p><b>Line 4:</b>  Active digital output functions</p>

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Start/Stop ----- 09</p> <p>STOA:• STOB:• DIAG:•</p> <p>RF RB CO MB BR1234</p> <p>• . . . . .-&gt;.</p> </div>	<p><b>Page 09: Start / Stop</b></p> <p>Online display of the digital inputs and outputs important for the start / stop process:</p> <p><b>Line 2:</b></p> <p>STOA: Status STO_A (input)          STOB: Status STO_B (input)</p> <p>Large dot next to the designation indicates that there is a signal at the input and the internal diagnostic unit for monitoring the STP inputs has detected no error          If there is no signal at the inputs, the amplifier is securely locked (STO activated).          DIAG: Status of the internal diagnostic unit          Large dot next to the designation indicates that the internal diagnostic unit has not detected any error, if no dot is displayed, the internal diagnostic unit has detected an error</p> <p><b>Line 3:</b></p> <p>RF – Controller enable (input)          RB – Controller ready / Contactors switching (output)          CO – Contactor monitoring (input)          MB – mechanical brake switching (output)          BRx – Brake monitoring contacts</p> <p><b>Line 4:</b></p> <p>RF, RB, CO, MB, BRx: A large dot beneath the description indicates the input or output is active</p> <p>A "!" under the monitor input "CO" or "BR" indicates that this monitoring function has been deactivated in the "Monitoring" menu.</p> <p>After "-&gt;": Status of electronic short-circuit:          Small dot: short-circuit deactivated          Large dot: short-circuit active          o: short-circuit switches from inactive to active (duration &lt; 0.1 s)          t: short-circuit switches from active to inactive (duration 1.1 s)</p>
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>Cu-Ports----- 10</p> <p>In: BR1234...Out:</p> <p>12345678 B C12 12345</p> <p>..... • . . . . •</p> </div>	<p><b>Page 10: Cu-Ports</b></p> <p>Online-display</p> <p><b>Line 2:</b></p> <p>Brake monitoring inputs BR1...BR4, large dot after BR1...BR4 indicates the input is active</p> <p><b>Line 3:</b></p> <p>1...8: digital inputs I1...I8          B: Function and temperature monitoring for brake resistor or brake chopper          C12: Contactor monitoring          1...5: Digital outputs O1...O5</p> <p><b>Line 4:</b></p> <p>A big dot below the description displays the input or output is active</p>


<pre>Encoder ----- 11 2048Inc 5.03V Type? En:• •Err: 0x00000000 Cnt:3941=345° A B</pre>	<p><b>Page 11: Encoder</b>  Online-display  <b>Line 2:</b>  Configured rotary encoder resolution  Rotary encoder supply voltage  Detected rotary encoder type (with absolute value encoders)  Configured rotary encoder type (with incremental encoders)  <b>Line 3:</b>  Enable first point: Enabling of the supply voltage for absolute rotary encoder  Enable second point: Absolute rotary encoder performance test  [S]  both points must be active  [A]  both points must be off  ERR: Rotary encoder fault code; 0 must be displayed if there are no faults in the rotary encoder.  <b>Line 4:</b>  Cnt: Counter reading for impulse counter (0 - 4x encoder resolution) and display of motor revolution in degrees (360° = one revolution of the motor)  A and B: graphic display of the sine signal (A) and cos signal (B)</p> <p>The display can be frozen by pressing the  key.</p>
<pre>Power1 ----- 12 DC IGBT PWM ED: 10% •• •• .. ■ FAN: 0% UDC:565V Temp: 28C</pre>	<p><b>Page 12: Power1</b>  Power stage condition (point for condition OK)  <b>Line 2 und 3:</b>  DC:  first point: Precharge relay switched on  second point: Power stage power supply  both points must be active during normal operation  IGBT:  first point: ower stage power supply  second point: Power stage power supply OK  both points must be active during normal operation  PWM:  first point: PWM power stage enabled  second point: Power stage power supply OK  Both points are only active during driving  Bar display under M:  narrow: Clock frequency 4 kHz fixed  medium: Clock frequency 8 kHz  wide: Clock frequency 16 kHz</p> <p>ED:  Duty cycle of the ZAdyn4Bplus (time interval: 10 minutes)  FAN:  Speed of the fan in %</p> <p>If the  button is pressed, the temperature of the module print will be displayed in line 3 on the right ("MP:xxC").</p> <p><b>Line 4:</b>  UDC: DC-link voltage  Temp: Power stage temperature</p> <p>The display can be frozen by pressing the  key.</p>


<pre>Power2 ----- 13 ERR_EXT U. OC: ... SRC_APP. UCE_P: ... SRC_MOP. UCE_M: ....</pre>	<p><b>Page 13: Power2</b>  Cause for excess current malfunction</p> <p><b>Line 2:</b>  ERR_EXT: Overcurrent message (display is not saved; point is only displayed if overcurrent is present )  U: Overvoltage error in the DC-link (voltage higher than 850 V DC)  OC: overcurrent was detected by the current sensors (incorrect phase is indicated by letters U V W)</p> <p><b>Line 3:</b>  SRC_APP: Overcurrent is detected by the application processor.  UCE_P: Error in positive current path in power stage (faulty phase is displayed)</p> <p><b>Line 4:</b>  SRC_MOP: Overcurrent is detected by the motor management processor.  UCE_M: Error in negative current path in power stage (faulty phase is displayed)</p> <p>During normal operation, no points and phase displays (U V W) should be active  During a malfunction, the displays remain active until the next travel command (with the exception of ERR_EXT)</p>
<pre>Bus Info 1 ----- 14 Info: xx 0101 / 010106 de Load: 77% - 12.3A</pre>	<p><b>Page 14: Bus Info 1</b>  Information about the control system</p> <p><b>Line 2:</b>  Manufacturer:</p> <p><b>Line 3:</b>  Software version of control system  Software date of the control system  Operating language set in the control system, display according to ISO639  The operating language of the frequency inverter is automatically adapted.</p> <p><b>Line 4 (only with DCP4):</b>  Load in % (0% = cabin empty)  Load-dependent start torque current</p>
<pre>Bus Info 2 ----- 15 B01..4... G...4... S.1...6. 100 RF UP V_3* MTW</pre>	<p><b>Page 15: Bus Info 2</b>  Online-display</p> <p><b>Line 2:</b>  Command and speed bytes  B= command byte  G= speed byte</p> <p><b>Line 3:</b>  Status byte  S= Statusbyte  Current operating state of the ZAdyn4Bplus</p> <p><b>Line 4:</b>  Display of the actual travel commands:  RF: Controller enable  Travel direction  controlled travel speed  MTW: Motor temperature pre-warning, displayed at overtemperature (for ZAdyn4)</p> <p>See chapter "Serial Communication / DCP (Drive Control &amp; Position)" for further information about DCP operation.</p>



<p><b>Display 1</b></p> <pre>Bus Info 3 ----- 16 sv_I7: +0002210mm sv: +0002198mm Prg:Rea 1.15:x.xxm/s</pre> <p><b>Display 2</b></p> <pre>Bus Info 3 ----- 16 sv_I7: +0002210mm sv: +0002198mm Prg:Rea 1.15:1.10m/s</pre>	<p><b>Page 16: Bus Info 3</b> Online-display <b>Line 2:</b> Display of the deceleration path. The deceleration path is calculated before starting the journey. <b>Line 3:</b> Display of the remaining path. The display is updated during travel continually. <b>Line 4:</b> <b>Display 1:</b> Shows the ratio of set nominal speed to real speed. Display during travel (providing that the controller supports the "I9" position telegram) <b>Display 2:</b> Shows the ratio of set nominal speed to real speed. Display after travel (providing that the controller supports the "I9" position telegram)</p>
<pre>Bus Info 4 ----- 17 RX_TIM 1 RX_XOR 0 TX_ERR 0</pre>	<p><b>Page 17: Bus Info 4</b> Online display of transmission errors that increase the counter level during running operation as soon as transmission errors occur: <b>Line 2:</b> RX_TIM: Timing (open loop control does not answer within the cycle time) <b>Line 3:</b> RX_XOR: erroneous control telegram is detected by the frequency inverter <b>Line 4:</b> TX_ERR: erroneous frequency inverter telegram is detected by the control</p>
<pre>Bus Info 1----- 14 Act• Mode: Velocity T_max: 0 RErr: 0 NMT:Preop./Warn.Lim:</pre> <pre>Bus Info 1----- 14 Act• Mode: Velocity T_max:0.7ms TErr: 0 NMT:Preop./Warn.Lim:</pre>	<p><b>Page 14: Bus Info 1</b> Information about CAN operation <b>Line 2:</b> Act: A dot signals that the ZAdyn4Bplus is set to CAN Mode: Operating mode (velocity or position) <b>Line 3:</b> T_max: Number of cycles, which exceeded the maximum process time RErr: Recieve buffer - error counter <b>Line 4:</b> NMT: Shows the actual NMT status (see chapter "Serial Communication / NMT") <b>Pressing the  button</b> <b>Line 3:</b> T_max: Maximum time for processing the CAN messges per cycle, since switch-on TErr: Transmit buffer - error counter</p>
<pre>Bus Info 2----- 15 V_CAN: + 0mm/s Contr.:Disable Volt. Status:Sw. On Disab.</pre>	<p><b>Page 15: Bus Info 2</b> Active in velocity mode <b>Line 2:</b> V_CAN: Speed, sent from the control system to the ZAdyn4Bplus <b>Line 3:</b> Contr. Control-byte. Shows commands which are sent by the control system <b>Line 4:</b> Status: Status byte. Shows the CAN statuses of the ZAdyn4Bplus</p>
<pre>Bus Info 2----- 15 S_CAN + 0mm Contr.:Disab. Volt. Status:Sw.On Disab.</pre>	<p><b>Page 15: Bus Info 2</b> Active in position mode <b>Line 2:</b> S_CAN: Relative target position that is sent from the control system to the ZAdyn4Bplus <b>Line 3:</b> Contr. Control-byte. Shows commands which are sent by the control system <b>Line 4:</b> Status: Status byte. Shows the CAN statuses of the ZAdyn4Bplus <b>After pressing the  button the display shows the maximum travel speed, sent by the control system</b></p>

<pre> Bus Info 3----- 16 Err act. Last:No Err Rec Tra Warn Pas off 0 0 0 0 0         </pre>	<p><b>Page 16: Bus Info 3</b>  Information about telegram errors in CANopen lift operation  <b>Line 2 (from left to right):</b>  Error status  Load: Fault which last occurred</p> <table border="1"> <thead> <tr> <th></th> <th>Displayed text:</th> <th>Meaning</th> </tr> </thead> <tbody> <tr> <td>Error status</td> <td>"Err act." "Warning" "Err pass" "Bus off"</td> <td>Error active Warning Error passive Bus off</td> </tr> <tr> <td>Load: Fault which last occurred</td> <td>"No Err" "Stuff" "Form" "ACK" "Bit(r)"  "Bit(d)" "CRC"</td> <td>No error Stuffing Error Form Error Acknowledge Error Bit Error (Recessive Level was output but Dominant Level detected) Bit Error (Dominant Level was output but Recessive Level detected) CRC Error</td> </tr> </tbody> </table> <p><b>Line 3 and 4:</b>  Rec: Number of receive errors  Tra: Number of transmit errors  Warn: Indication of how often the ZAdyn4Bplus switched to the warning status  Pas: Indication of how often the ZAdyn4Bplus switched to the error passive status  off: Indication of how often the ZAdyn4Bplus switched to the bus off status</p>		Displayed text:	Meaning	Error status	"Err act." "Warning" "Err pass" "Bus off"	Error active Warning Error passive Bus off	Load: Fault which last occurred	"No Err" "Stuff" "Form" "ACK" "Bit(r)"  "Bit(d)" "CRC"	No error Stuffing Error Form Error Acknowledge Error Bit Error (Recessive Level was output but Dominant Level detected) Bit Error (Dominant Level was output but Recessive Level detected) CRC Error
	Displayed text:	Meaning								
Error status	"Err act." "Warning" "Err pass" "Bus off"	Error active Warning Error passive Bus off								
Load: Fault which last occurred	"No Err" "Stuff" "Form" "ACK" "Bit(r)"  "Bit(d)" "CRC"	No error Stuffing Error Form Error Acknowledge Error Bit Error (Recessive Level was output but Dominant Level detected) Bit Error (Dominant Level was output but Recessive Level detected) CRC Error								
<pre> Bus Info 4----- 17 AbsEncmm: 5358 MotEncmm: + 4169 Offs:13081A/M 1.28         </pre>	<p><b>Page 17: Bus Info 4</b>  Calibration  <b>Lines 2 - 4:</b>  For calibrating the distances which were sent by the rotary encoder and the shaft encoder.</p>									
<pre> A+R ----- 18 0.62 0.62 m/s3 0.50 0.50 m/s2 0.62 0.50m/s3         </pre>	<p><b>Page 18: A&amp;R</b>  Display of configured values for:</p> <ul style="list-style-type: none"> <li>Acceleration</li> <li>Rampdown time</li> </ul> <p>dependent on the operating curve of a normal ride  <b>Line 2:</b>  Upper rounding of the acceleration in <math>m/s^3</math>  Upper rounding of deceleration in <math>m/s^3</math>  <b>Line 3:</b>  Acceleration in <math>m/s^2</math>  delay in <math>m/s^2</math>  <b>Line 4:</b>  Lower rounding of acceleration in <math>m/s^3</math>  Lower rounding of the deceleration in <math>m/s^3</math></p>									
<pre> Energy ----- 19 Power: 22.120 W Work: 16 Wh -15Wh         </pre>	<p><b>Page 19: Energy</b>  <b>Line 2:</b>  Power: current frequency inverter power in watts  <b>Line 3:</b>  Work: Energy meter. Indication of the work performed in watt hours.  <b>Line 4:</b>  Energy meter, specification of generated work in watt-hours</p>									

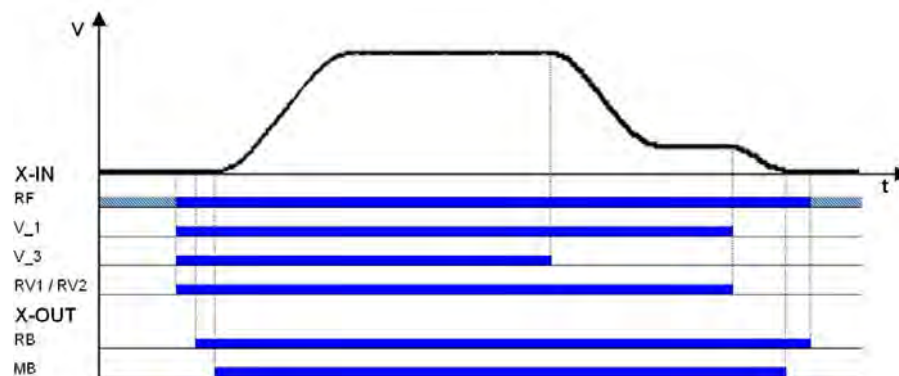
<pre> InfoBus ----- 20 Ident-No 0123456789AB Exist: xxxx Error 0000         </pre>	<p><b>Page 20: InfoBus</b>                  Display of frequency inverter configuration</p> <p><b>Line 2:</b>                  Ident no. of the internal assemblies</p> <p>0: Controller Unit (CU)                  1: Shunt module (CUSH)                  2: reserved                  3: reserved                  4: ZAdyn 040-074: reserved                  ZAdyn 110-220: Sensor module (SM)                  5: ZAdyn 040-074: Switching Power Print (SP)                  ZAdyn 110-220: Master Print (MP)                  6: ZAdyn 040-074: Power Unit (PU)                  ZAdyn 110-220: Thyristor Control (TC)                  7: ZAdyn 040-074: DC-Link (DC)                  ZAdyn 110-220: IGBT-Drive Phase U (ID)                  8: IGBT-Drive Phase V (ID2)                  9: IGBT-Drive Phase W (ID3)                  A: IGBT-Drive BR (ID4)                  B: MASH</p> <p><b>Line 3:</b>                  Each available board is identified in accordance with the population of the frequency inverter (see also menu "HW Ident."):                  x: identification of the board by reading out the EEPROM                  m: identification by manual default in the menu "HW-Ident."</p> <p><b>Line 4:</b>                  Error allocation of the assembly</p> <p>1: No answer                  2: Incorrect or unknown object                  3: No proper EEPROM connection                  4: No or unknown part number                  5: No or unknown index                  6: Original and backup copy are not identical</p> <p>During flawless operation, all internal assemblies must be displayed with a "0"</p>
<pre> Travel direction--- 21 TD_SET 1.000.000 TD_CNT 874.891 TD_DRV 1.364.832         </pre>  <pre> Travel direction--- 21 TD_RES 10 TD_CNT 874.891 TD_DRV 1.364.832         </pre>	<p><b>Page 21: Travel direction</b>                  Display the direction changes</p> <p><b>Line 2:</b>                  TD_SET: Initial value of the down counter</p> <p><b>Line 3:</b>                  TD_CNT: Travel direction counter, resettable.                  Indicates the change of direction still possible with the current suspension means.                  After resetting the travel direction counter, TD_RES will be increased</p> <p><b>Line 4:</b>                  TD_DRV: Total counter of the travel direction changes.                  Value remains after resetting the down counter</p> <p><b>Page 21: Travel direction</b>                  While pressing the  button, <b>line 2</b> shows the actual number of counter resets "TD_RES".</p>

<pre> ASM_ID ----- 22 1530rpm 23.3A 9.5A 53.1Hz 338V 168ms 0.83cos &lt;GOOD 1.2&gt;         </pre> <pre> ASM_ID ----- 22 1530rpm 23.3A 9.5A 53.1Hz 338V 168ms 0.83cos 12345Ams         </pre>	<p><b>Page 22: ASM_ID</b></p> <p><b>Line 2:</b>  Determined motor speed  Determined motor current  Determined magnetisation current</p> <p><b>Line 3:</b>  Determined frequency  Determined motor voltage  Determined rotor time constant</p> <p><b>Line 4:</b>  Determined cos phi  Status text, factor by which the original values have been corrected</p> <p>With  key pressed:</p> <p><b>Line 4:</b>  Determined cos phi  Magnetisation current x rotor time constant</p>
<pre> Cuec ----- 23 Func: DCP &amp; CAN &amp; AN Stat: GRN         </pre>	<p><b>Page 23: CUEC</b>  Expansion board "Control"</p> <p><b>Line 2:</b>  Func: Functions of the expansion board "Control"</p> <p><b>Line 4:</b>  Stat: LED status of the expansion board "Control"</p>

## 13 Travel options

### 13.1 Normal travel

The figure shows the sequence of a trip between two floors with the corresponding input and output signal processes. You can find a detailed description of the various acceleration and deceleration processes in this chapter.



Normal travel  
*RF* Controller enable  
*V\_1* Positioning speed  
*V\_3* High travelling speed  
*RV1 / RV2* Direction  
*RB* Controller ready  
*MB\_Brake* Mechanical brake

### 13.2 Start-up and acceleration

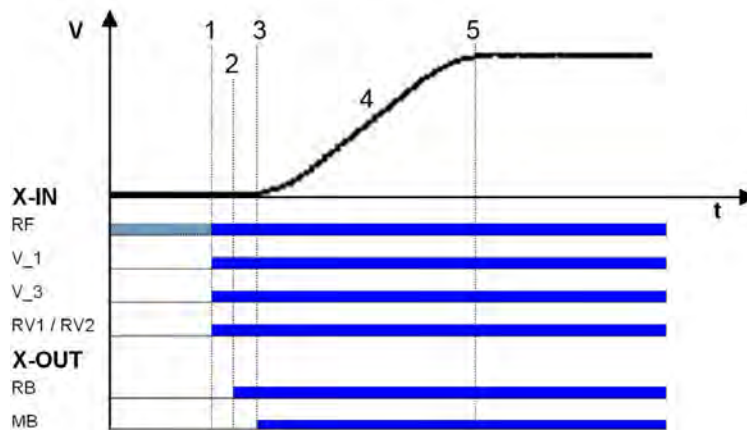
To be able to travel, the ZAdyn4Bplus requires at least the following input signals:

- Controller enable (RF)
- Speed (V\_1, V\_2 or V\_3)
- Travel direction (RV1 or RV2)

#### 13.2.1 Acceleration - default

##### Start-up procedure with default acceleration

1	The elevator control system triggers the following frequency inverter inputs: <ul style="list-style-type: none"> <li>• Controller enable (RF), can already be triggered</li> <li>• Speed V_1 and V_3</li> <li>• Direction of travel RV1</li> </ul>
2	The frequency inverter switches the digital "RB" contactor output with a time delay. With this signal, the inputs of the STO function must be activated immediately ("1" signal) or motor contactors energized.
3	The frequency inverter switches the digital output "MB brake" with a time delay. The brakes must be opened without delay with this signal.
4	The controller accelerates the motor up to the highest triggered speed (V_3) according to the set acceleration and round off.
5	Target speed V_3 has been reached.

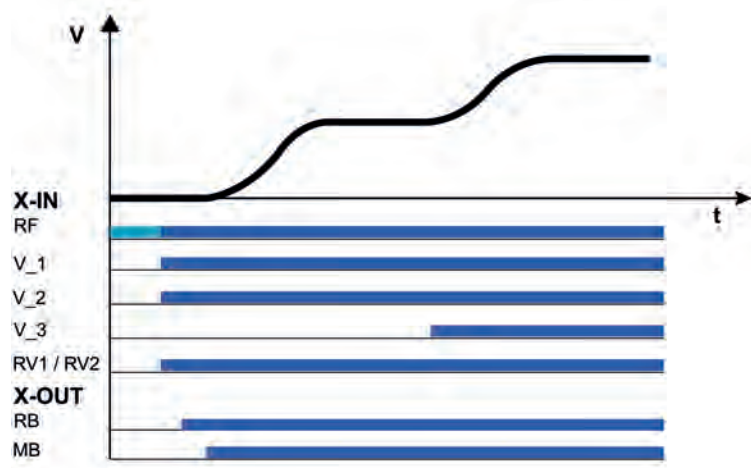


Starting with default acceleration

- RF* Controller enable
- V\_1* Positioning speed
- V\_3* High travelling speed
- RV1 / RV2* Direction
- RB* Controller ready
- MB\_Brake* Mechanical brake

### 13.2.2 Acceleration with intermediate speed

It is possible to accelerate to different intermediate speeds when starting.



Starting with acceleration from V\_1 to V\_2

### 13.3 Optimizing start up behavior

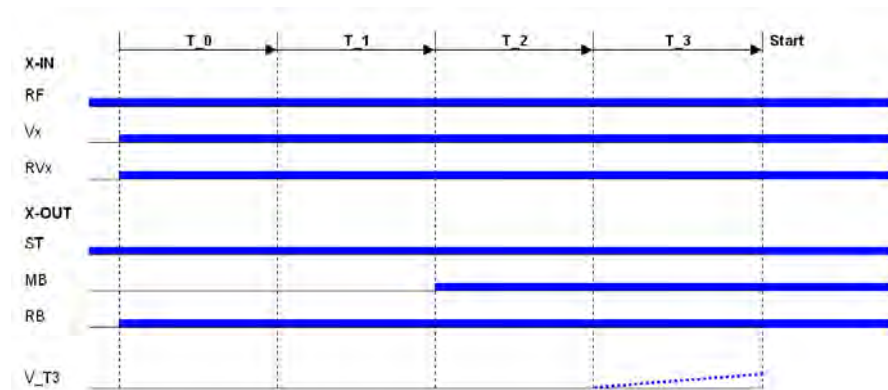
Optimizing the start up behavior is only necessary if there is a negative influence on the travel comfort (e.g. through start up jerks)



#### Information

- Proper installation condition (rail guides, car suspension, transmission oil filling, etc.)
- The car must be empty and the counterweight completely loaded. Start-up for all loading conditions can only be optimally adjusted under these conditions
- The speed control parameters must be correctly set in the **Controller** menu (see "Commissioning / Setting the speed control" chapter)

#### Start-up time sequence



- T\_0* Time until motor contactors have been opened
- T\_1* Time until magnetizing flux has been built up (only with asynchronous motors)
- T\_2* Time until brake has been opened
- T\_3* Time in which the motor is controlled to speed 0 or accelerated to V\_T3
- RF* Controller enable
- Vx* travel speed
- RVx* Travel direction
- ST* Controller failure
- MB\_Brake* Mechanical brake
- RB* Controller ready

The various times can be set in the **Start** menu

**Time optimisation through contactor monitoring (optional)**

With monitoring of contactors activated (Monitors/CO activated) and monitor contacts connected, the time T\_0 is optimised. As soon as the contactors are closed, the time T\_0 is interrupted and the time T\_1 started.

**Time optimization through brake monitoring**

If the brake monitoring is activated (**Monitoring/BR≠ON**) and the monitoring contacts are connected, the time T\_2 is optimized. As soon as the brakes are opened, time T\_2 is aborted and time T\_3 started.

**13.3.1 Damping the start-up jerk**

**Applies to all start-up variations!**

To reduce a startup jolt, you can accelerate to speed V\_T3 linearly whilst T\_3 is running. This overcomes the static friction and reduces the startup jolt (see diagram).

**13.3.2 Start-up variations**



**Information**

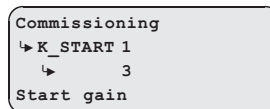
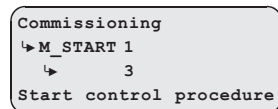
The optimal start-up variations are preset based on the motor type selection in the **Motor name plate** menu.

**S** Synchronous motors: MOD5

**A** Asynchronous motors: MOD1

Additional start-up variations are only required in special cases.

The various start-up variants can be configured in the **Start-up/M\_START** menu. The amplification of the speed or position controller K\_START is configured in the **Start-up/K\_START** menu.



**MOD1 (default setting for asynchronous motors).**

The drive is speed-controlled. Up to the end of T\_2, the speed is maintained at nominal value = 0. A change in position of the shaft is not corrected. The parameter "K\_START" is used to increase the speed controller amplification. It is activated at the start of T\_1 and deactivated at the end of T\_2

**MOD2**

Corresponds to the MOD5 function. The parameter "s\_start" is activated additionally. If the drive position changes during the time T\_2 by the value entered in "s\_start", "K\_START" is switched off. This prevents the drive from being damaged by too high a value of "K\_START".

**MOD3**

The drive is position- and speed-controlled. Please note that both controls are set via "K\_START" and are therefore dependent on one another. The position and speed control is activated at the start of T\_1 and deactivated at the end of T\_2.



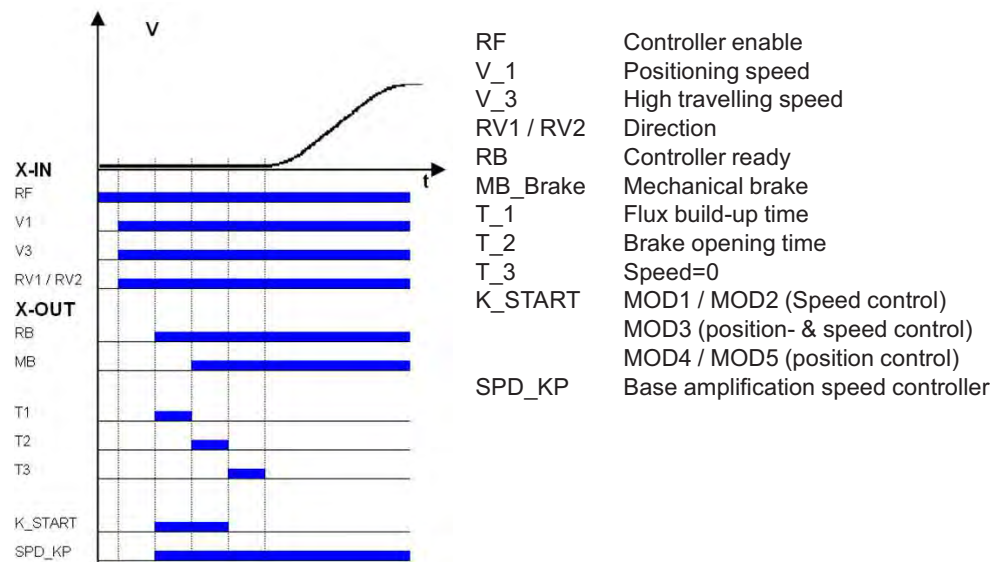
**MOD5 (standard setting for synchronous motors)**

The drive is position-controlled. Up to the end of T<sub>2</sub>, the drive position is recorded and corrected if there is a change. The parameter "K\_START" is the position controller amplification. It is activated at the start of T<sub>1</sub> and deactivated at the end of T<sub>2</sub>.

**MOD4**

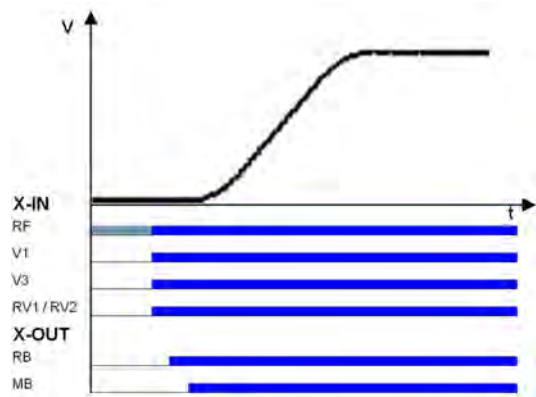
Corresponds to the MOD5 function. The parameter "s\_start" is activated additionally. If the drive position changes during the time T<sub>2</sub> by the value entered in "s\_start", "K\_START" is switched off. This prevents the drive from being damaged by too high a value of "K\_START".

**Start-up variations**



**13.4 Optimizing the acceleration**

The acceleration ramp is defined by the parameter in the **Accelerating** menu. By changing the parameter values, you can adapt the curve shape to the requirements



Acceleration ramp  
 RF Controller enable  
 V\_1 Positioning speed  
 V\_3 High travelling speed  
 RV1 / RV2 Direction  
 RB Controller ready  
 MB\_Brake Mechanical brake

**A\_POS:** Acceleration preset in m/s<sup>2</sup>. A higher value causes greater acceleration and thus a steeper ramp  
**R\_POS1:** Setting the lower round off. A higher value causes a softer round off  
**R\_POS2:** Setting the upper round off. A higher value causes a softer round off.





**Information**

To achieve optimum starting behavior:

- The inputs of the STO function must be activated immediately with the digital output "RB" ("1" signal) or motor contactors energized
- The brakes must be switched instantaneously with the digital output "MB"

**13.5 Traveling speed defaults**

After entering the installation specifications and carrying out the automatic parameter assignment, the traveling speeds "V\_2" and "V\_3" are pre-configured in the **Travelling** menu, dependent on "V\*".

Designation	Parameter	pre-signment
Intermediate speed V_2	V_2	50% V*
Travel speed V_3	V_3	100% V*

The speeds listed in the table below are permanently preset and thus independent of "V\*".

Designation	Parameter	pre-signment
Positioning speed	V_1	0,05 m/s
Readjustment speed	V_Z	0.01 m/s
Additional speed V_4	V_4	0,32 m/s
Additional speed V_5	V_5	0,32 m/s
Additional speed V_6	V_6	0,32 m/s
Additional speed V_7	V_7	0,32 m/s

**13.6 Distance-dependent delay**

In a path-dependent deceleration, the deceleration paths are always identical. Independent of the speed reached at the start of the deceleration.

The distance-dependent deceleration is configured using the **DECELERATION/S\_ABH** parameter.

All decelerations from higher to lower speeds are dependent on the distance.



**Information**

Before removing the digital input for the travel speeds V\_3 or V\_2 the input for the travel speed V\_1 must be applied (see diagram "Normal stop at distance-dependent deceleration").

If it is not possible to control two travelling speeds simultaneously for technical reasons (e.g. control of the speeds by an alternating contact), the distance-dependent delay with the **Control system/-SIM\_V1=ON** parameter can be activated!

Here it must be noted that the positioning speed V\_1 must be activated 100 ms after deactivation of the travelling speeds V\_3 or V\_2 at the latest!

If binary speed is specified, there is only a distance-dependent delay at **Control system/SIM\_V1=ON!**

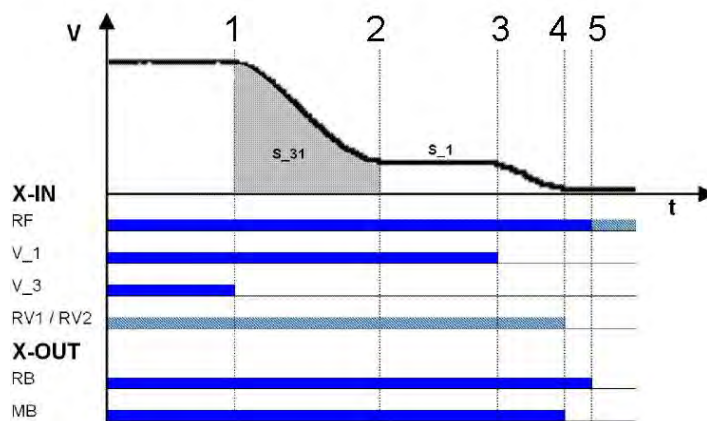


**Information**

If the high travelling speed signal is briefly switched off (e.g. V\_3), the frequency inverter slows down the motor to the positioning speed V\_1. For safety reasons, further actuation of a greater travelling speed is ignored. A greater travelling speed may only be actuated once all inputs for the travelling speeds have been switched off and once the motor has reached the speed 0.

**13.6.1 Distance-dependent deceleration - default**

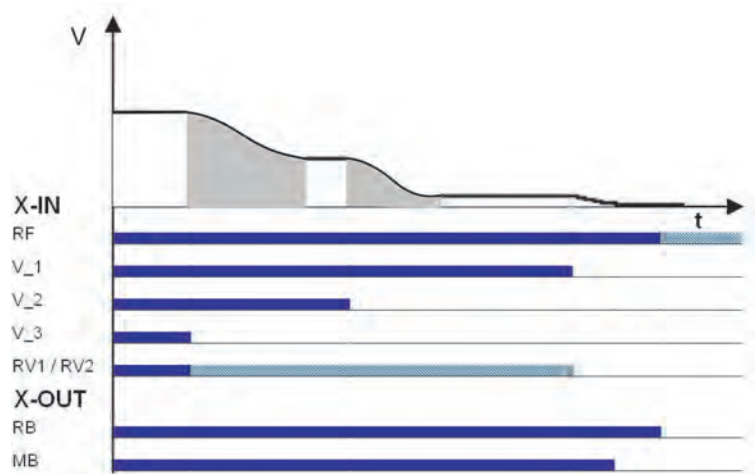
<b>1</b>	When the switch off point for the traveling speed is reached, the configured final speed $V_3$ has been reached. Deceleration is initiated
<b>2</b>	Travel at positioning speed $V_1$ .
<b>3</b>	Positioning speed $V_1$ is switched off. Motor continues to decelerate.
<b>4</b>	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current
<b>5</b>	The current to the motor is switched off Output RB is switched off The inputs of the STO function must be deactivated immediately ("0" signal) or motor contactors de-energized.



Normal stop during path dependent deceleration  
*RF* Controller enable  
*V\_1* Positioning speed  
*V\_3* High travelling speed  
*RV1 / RV2* Direction  
*RB* Controller ready  
*MB\_Brake* Mechanical brake

### 13.6.2 Distance-dependent deceleration with intermediate speed

It is possible to also decelerate from V\_3 to V\_2 when stopping with distance-dependent deceleration.



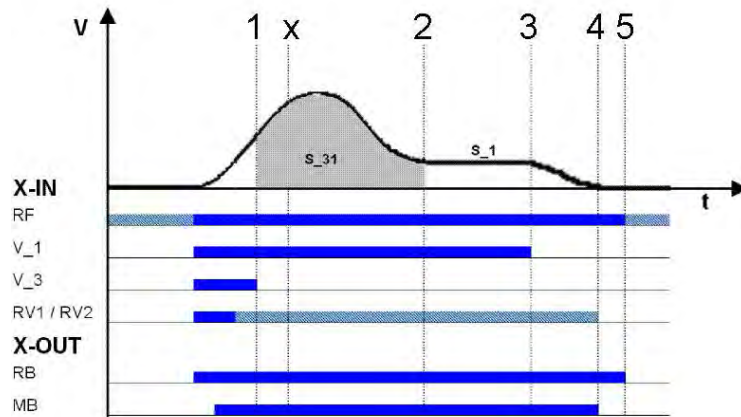
Normal stop with distance-dependent deceleration and deceleration from V\_3 to V\_2.

- RF Controller enable
- V\_1 Positioning speed
- V\_2 Intermediate speed
- V\_3 High travelling speed
- RV1 / RV2 Direction
- RB Controller ready
- MB\_Brake Mechanical brake

### 13.6.3 Arch travel with distance-dependent deceleration

If the distance between the floors is short and the selected end speed (V\_2 or V\_3) is not achieved, the ZAdyn4Bplus will perform an arch travel profile journey. The arch travel profile journey means that the same creep paths are always achieved regardless of the speed reached at the switch-off time.

1	When the switch off point for the traveling speed is reached, the configured final speed is not yet reached. The motor continues to be accelerated. The point from which the deceleration must be initiated is calculated.
x	Deceleration is initiated
2	Travel at positioning speed V_1.
3	Positioning speed V_1 is switched off. Motor continues to decelerate.
4	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current
5	The current to the motor is switched off Output RB is switched off The inputs of the STO function must be deactivated immediately ("0" signal) or motor contactors de-energized.



Arch travel  
*RF* Controller enable  
*V\_1* Positioning speed  
*V\_3* High travelling speed  
*RV1 / RV2* Direction  
*RB* Controller ready  
*MB\_Brake* Mechanical brake

That means that during a normal trip and during arch travel, the deceleration path  $V_3 \rightarrow V_1$  (S\_31) and the creep path  $V_1 \rightarrow \text{speed } 0$  (S\_1, only with DCP 1/DCP 3) are identical.

### 13.7 Time-dependent deceleration

Time-dependent deceleration is activated for all speed transitions if the menu **Decelerating/S\_ABH = OFF**.

After switching off the current speed preset, the motor is decelerated time-dependent, according to the configured decelerations and round offs, to the highest speed still triggered.

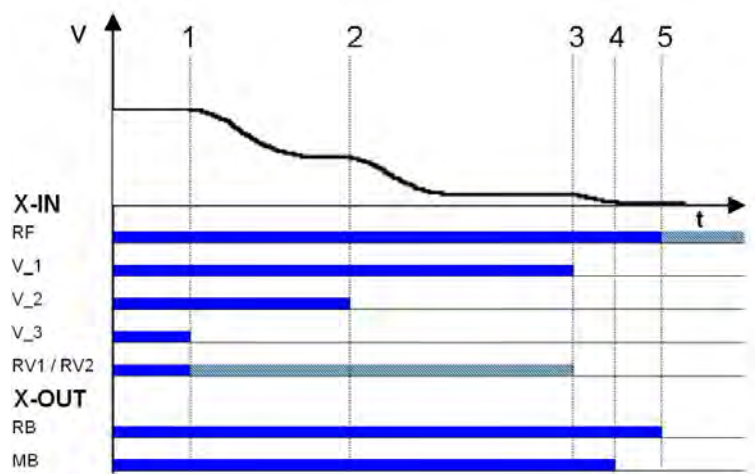


#### Information

In a time-dependent deceleration, the deceleration paths vary dependent on the speed attained at the time the deceleration starts. For this reason, time-dependent deceleration only makes sense if traveling speed is reached during each trip.

#### 13.7.1 Deceleration with reached traveling speed

1	When the switch off point for the traveling speed is reached, the configured final speed $V_3$ has been reached. Deceleration to $V_2$ is initiated
2	Switch off point for $V_2$ Deceleration to $V_1$ is initiated
3	Positioning speed $V_1$ is switched off. Motor continues to decelerate.
4	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current
5	The current to the motor is switched off Output RB is switched off The inputs of the STO function must be deactivated immediately ("0" signal) or motor contactors de-energized.

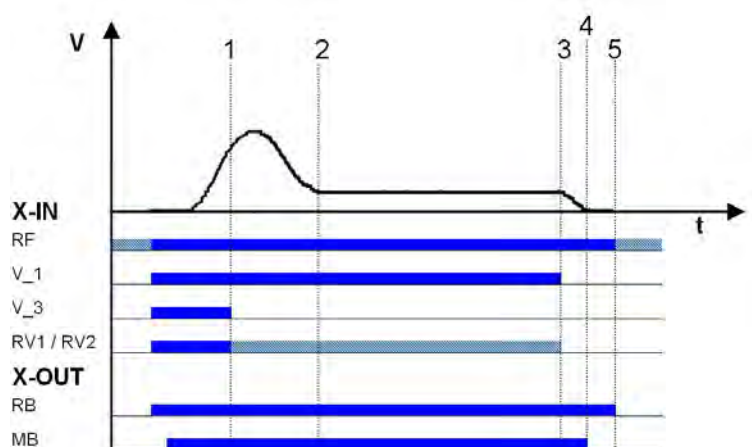


Time-dependent deceleration with reached traveling speed

- RF Controller enable
- V\_1 Positioning speed
- V\_2 Intermediate speed
- V\_3 High travelling speed
- RV1 / RV2 Direction
- RB Controller ready
- MB\_Brake Mechanical brake

### 13.7.2 Deceleration when traveling speed has not been reached

1	When the switch off point for the traveling speed is reached, the configured final speed V_3 is not reached. Deceleration is initiated
2	Travel at positioning speed V_1.
3	Positioning speed V_1 is switched off. Motor continues to decelerate.
4	Speed 0 Output MB is switched off Brake must operate immediately The motor continues to be fed with current
5	The current to the motor is switched off Output RB is switched off The inputs of the STO function must be deactivated immediately ("0" signal) or motor contactors de-energized.



Deceleration when traveling speed has not been reached

RF Controller enable  
V\_1 Positioning speed  
V\_3 High travelling speed  
RV1 / RV2 Direction  
RB Controller ready  
MB\_Brake Mechanical brake



**Information**

If the trip duration is monitored by the open loop control, due to the long trip time with a traveling speed of V\_1 an error message may result!

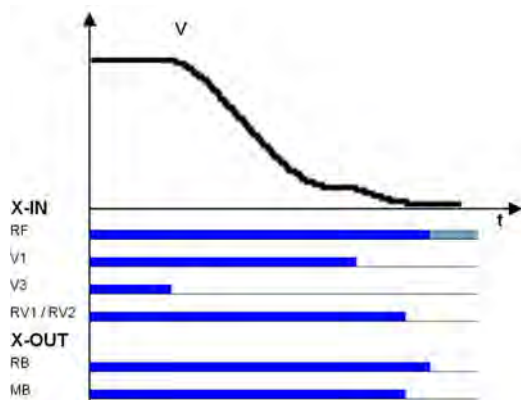


**Information**

If the traveling speed is switched off just before the preset final speed has been reached, it could happen that the floor is overshot.

**13.8 Optimizing deceleration**

The deceleration ramp is defined by the parameter in the **Deceleration** menu. By changing the parameter values, you can adapt the curve shape to the requirements



Deceleration ramp  
RF Controller enable  
V\_1 Positioning speed  
V\_3 High travelling speed  
RV1 / RV2 Direction  
RB Controller ready  
MB\_Brake Mechanical brake

- A\_NEG:** Deceleration preset in m/s<sup>2</sup>. A higher value causes greater deceleration and thus a steeper ramp.
- R\_NEG1:** Setting the upper round off. A higher value causes a softer round off.
- R\_NEG2:** Setting the lower round off. A higher value causes a softer round off.



**Information**

Adapting the parameter modifies the deceleration path  $V_3 \rightarrow V_1$ . The recalculated path is shown in the display. If necessary, correspondingly adapt the interrupt point for  $V_3$ .

**13.9 Creep path optimization**

Improvement of:

- Too long creep paths with travelling speed  $V_1$
- non-flush stopping due to  $V_1$  being prematurely switched off without additional installation work.

Using the creep path optimization in the menu:

**Decelerating / S\_DI1**

**Decelerating / S\_DI2**

**Decelerating / S\_DI3**

the traveling speeds  $V_1$ ,  $V_2$  and  $V_3$  are switched off in all floors delayed by the value configured in the corresponding menu.

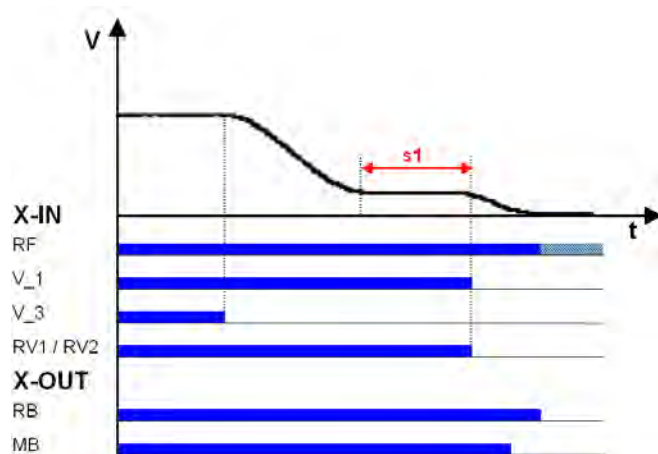
**Optimizing the crawl paths**

1	Travel to each floor from both directions of travel with the max. traveling speed $V_3$ or $V_2$ and check the crawl path $s_1$ in the "INFO / Page 03" menu. <div style="border: 1px solid black; padding: 5px; margin: 10px auto; width: fit-content;">                     Dist. ----- 03                      sa: 0.00 s21 0.52m                      sr: ^0.00 s31: 1.45m                      s1: 0.00 sd: 0.52m                 </div>
2	The value for $s_1$ should be the same for all floors from both travel directions. If the crawl paths differ, use the smallest value for $s_1$ .
3	In the <b>Decelerating</b> menu, change the values for "S_DI3" or "S_DI2" to that determined for $s_1$
4	Check the deceleration behaviour and correct the values for the parameters "S_DI3" or "S_DI2" if necessary.



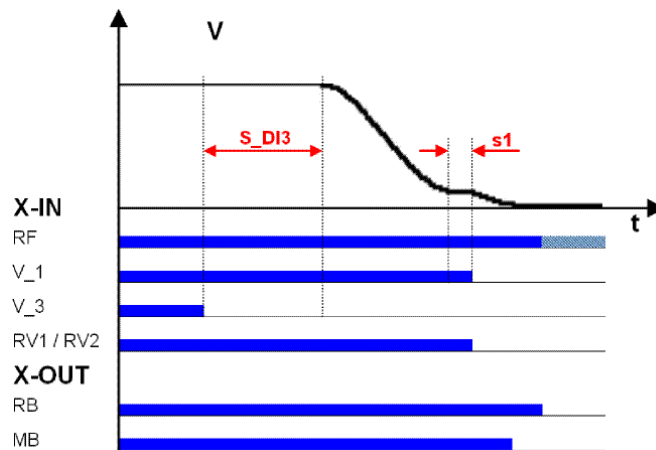
**Information**

If  $s_1$  has different values, it is not possible to get the same crawl path in all floors!



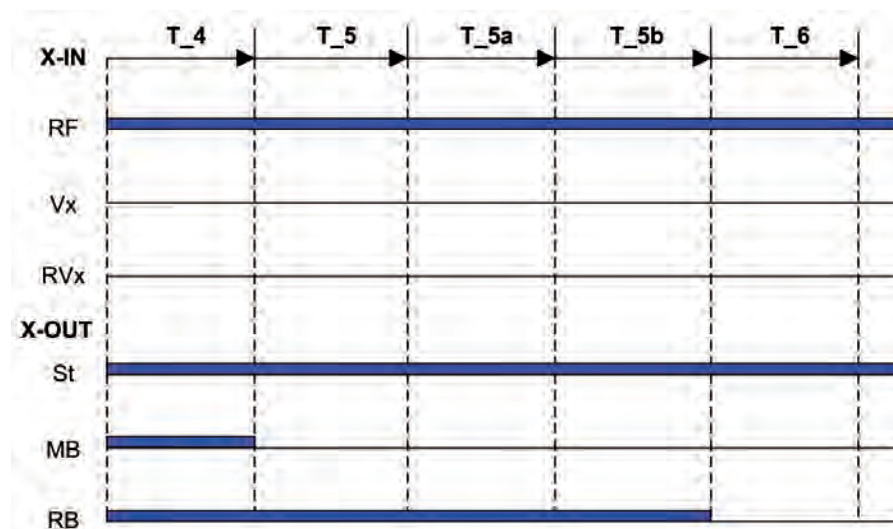
Deceleration with non-optimized crawl path

- RF Controller enable
- $V_1$  Positioning speed
- $V_3$  High travelling speed
- RV1 / RV2 Direction
- RB Controller ready
- MB\_Brake Mechanical brake



Deceleration with optimized crawl path  
*RF* Controller enable  
*V\_1* Positioning speed  
*V\_3* High travelling speed  
*RV1 / RV2* Direction  
*RB* Controller ready  
*MB\_Brake* Mechanical brake

### 13.10 Optimizing stopping Stopping time sequence



*T\_4* Hold speed 0  
*T\_5* Wait until the brake is closed  
*T\_5a* additional current supply of the motor  
*T\_5b* Wait until the motor is currentless  
*T\_6* Wait until contactors open  
*RF* Controller enable  
*Vx* travel speed  
*RVx* Travel direction  
*ST* Controller failure  
*MB\_Brake* Mechanical brake  
*RB* Controller ready

The various times can be set in the **Stop** menu.



**Time optimization through brake monitoring**

If the brake monitoring is activated (menu **Monitoring/BR≠Off**) and the monitor contacts are connected, time T\_5 is optimized. As soon as the brakes are closed, time T\_5 is aborted and time T\_5b started.

**Time optimisation through contactor monitoring (optional)**

If the contact monitoring is activated (menu **Monitoring/CO=ON**) and the monitor contacts are connected, time T\_6 is optimized. As soon as the contactors are open, time T\_6 is aborted and the stopping sequence ends.

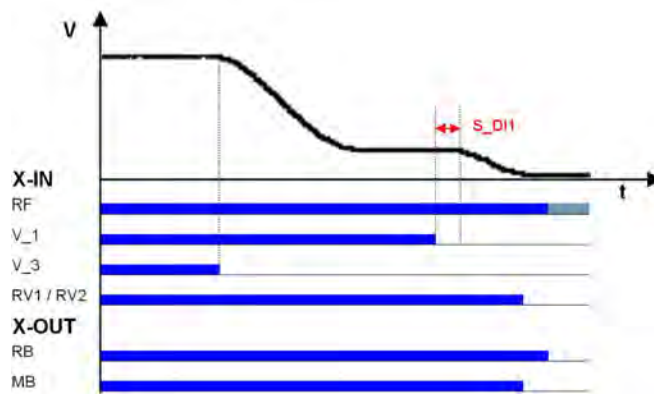
**13.11 Optimizing the step alignment**

1	Ascertain the distance of the flush in each floor by measuring manually
2	The clearance should be the same in all floors when approaching from both directions. If the values differ, use the smallest value determined.
3	In the <b>Decelerating</b> menu, configure the value for "S_DI1" to the ascertained value.
4	Check the deceleration behaviour and, if necessary, correct the value for the parameter "S_DI1".



**Information**

If there are different distances to the flush alignments, it is not possible to travel flush to all floors by modifying the parameter "S\_DI1"!



Optimizing the step alignment  
*RF* Controller enable  
*V\_1* Positioning speed  
*V\_3* High travelling speed  
*RV1 / RV2* Direction  
*RB* Controller ready  
*MB\_Brake* Mechanical brake

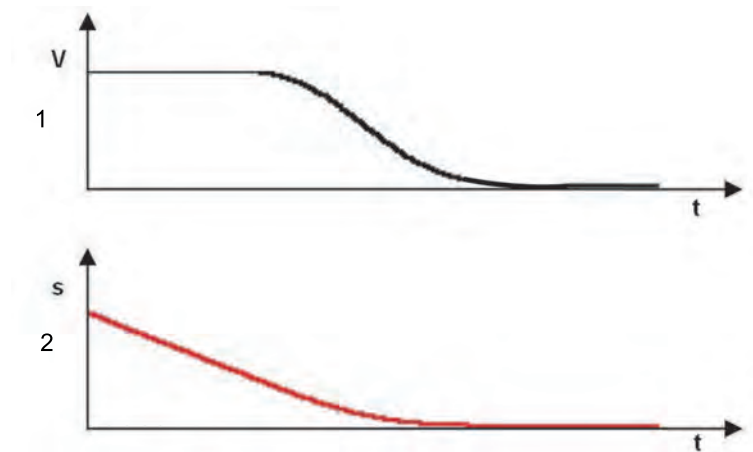
### 13.12 Direct levelling



#### Information

Direct engagement is only possible when using the DCP2, the DCP4 or the CANopen lift protocol in position mode and an absolute shaft copy.

With direct engagement, the control system indicates to the ZAdyn4Bplus the remaining distance to be travelled up to the stopping point. The frequency inverter slows down the motor in accordance with the specified remaining distance. This makes it possible to enter the stopping point without a creep path. Direct engagement enables intermediate speeds to be actuated.



Direct levelling with DCP protocol  
1 travel speed  
2 Residual distance

If the **Deceleration/S\_ABH=Slow** parameter is configured, landing takes place with an early reduction in the levelling speed.



### 13.13 Readjustment

Correction of the strain on the suspension means when loading and unloading the cabin. The cable extension is evaluated by the control.

The readjustment speed is configured in the **Travelling/V\_Z** menu and controlled through a digital input (configured to V\_Z).



#### Information

The traveling speed for readjustment takes precedence over the other traveling speeds.

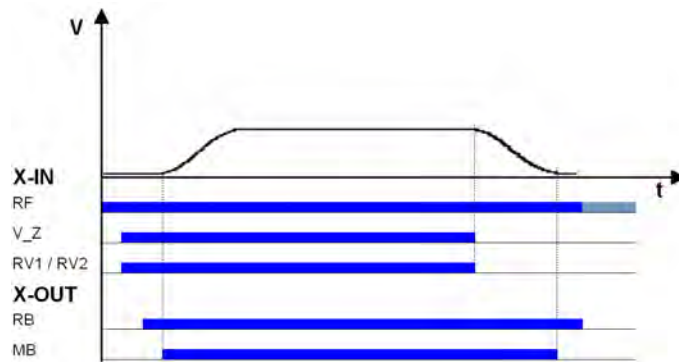
To be able to make a readjustment, at least the following input signals need to be present:

- Controller enable
- Readjustment speed V\_Z
- Direction



#### Information

To prevent oscillation, the control system must wait a suitable amount of time until the rope comes to rest before the readjustment is activated.



Readjustment speed  
*RF* Controller enable  
*V\_Z* Readjustment speed  
*RB* Controller ready  
*MB\_Brake* Mechanical brake

### 13.14 Operation in idle

With the ZAdyn4Bplus, both synchronous as well as asynchronous motors can be operated in an idle state.

CAUTION!

#### Caution!



When operating synchronous motors in idle, strong vibrations and noise development can result! Therefore, the factor for the speed controller basic-amplification "**SPD\_KP**" must be reduced to **approx. 0.1%**.

```
Brake Control
↳ SPD_KP 1.00
  ↳ 0.10
Base gain-factor
```

### 13.15 Quickstart

The motor is energized as the cabin door closes and the mechanical brake is opened. Motor speed is controlled to 0. This makes it possible to start travel immediately the door is closed.

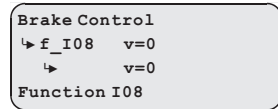


#### Information

The Quickstart function may only be used in the door zone range in elevators with adjustment control. The regulations of EN 81-20 must be observed.

#### 13.15.1 Brake Control

Configure digital input in the **Control system** menu to **v=0**.



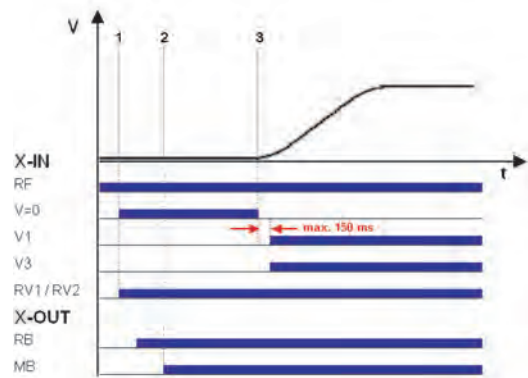
	Standard	DCP	CANOpenLift
1	<p>Cabin door closing</p> <p>Actuation of inputs:</p> <ul style="list-style-type: none"> <li>RF - Controller enable</li> <li>RVx - Default for travel direction</li> <li>v=0 - Hold speed 0</li> </ul> <p>Activation of output:</p> <ul style="list-style-type: none"> <li>RB - Controller ready</li> </ul> <p>The inputs of the STO function must be activated immediately ("1" signal) or motor contactors energized</p> <p>Motor energized</p>	<p>Cabin door closing</p> <p>Setting the bits by lift control:</p> <ul style="list-style-type: none"> <li>G2 - RPM 0</li> <li>B1 – travel command</li> <li>B2 – off switch</li> <li>B3 – travelling speed</li> <li>B4 – travel direction</li> </ul> <p>Setting the bits by ZAdyn4Bplus</p> <ul style="list-style-type: none"> <li>S1 – travel active</li> </ul> <p>The inputs of the STO function must be activated immediately ("1" signal) or motor contactors energized</p> <p>Motor energized</p>	<p>Cabin door closing</p> <p>Travel sequence via control word from control according to CiA specification 417, travel command as follows:</p> <ul style="list-style-type: none"> <li>Enable Voltage</li> <li>Disable Operation</li> <li>Target speed v=0</li> </ul> <p>The inputs of the STO function must be activated immediately ("1" signal) or motor contactors energized</p> <p>Motor energized</p>
2	<p>Activation of output:</p> <ul style="list-style-type: none"> <li>MB – mechanical brake</li> </ul> <p>Motor brake must be opened without a delay.</p> <p>Motor speed is controlled to 0.</p>	<p>Setting the bits by ZAdyn4Bplus</p> <ul style="list-style-type: none"> <li>S6 - mechanical brake</li> </ul> <p>Motor brake must be opened without a delay.</p> <p>Motor speed is controlled to 0.</p>	<p>Control opens the brake with "Enable Operation"</p> <p>Motor brake must be opened without a delay.</p> <p>Motor speed is controlled to 0.</p>
3	<p>Cabin door is closed</p> <p>Deactivation of input:</p> <ul style="list-style-type: none"> <li>v=0 - Hold speed 0</li> </ul> <p>Actuation of inputs:</p> <ul style="list-style-type: none"> <li>V1 - Positioning speed or</li> <li>V2 - Intermediate speed or</li> <li>V3 - travel speed</li> </ul> <p>Travel speeds must be actuated no more than 150 ms after input "v=0" has been deactivated!</p>	<p>Cabin door is closed</p> <p>Setting the bits by lift control:</p> <ul style="list-style-type: none"> <li>G6 - Intermediate speed or</li> <li>G7 – fast speed</li> <li>B3 – travelling speed</li> </ul> <p>Cancelling the bits by lift control:</p> <ul style="list-style-type: none"> <li>G2 - RPM 0</li> </ul> <p>Travel speeds must be actuated no more than 150 ms after input "v=0" has been deactivated!</p>	<p>Cabin door is closed</p> <ul style="list-style-type: none"> <li>Brake is monitored by control: Brake must be open</li> <li>Target speed set by control</li> </ul> <p>Travel speeds must be actuated no more than 150 ms after input "v=0" has been deactivated!</p>



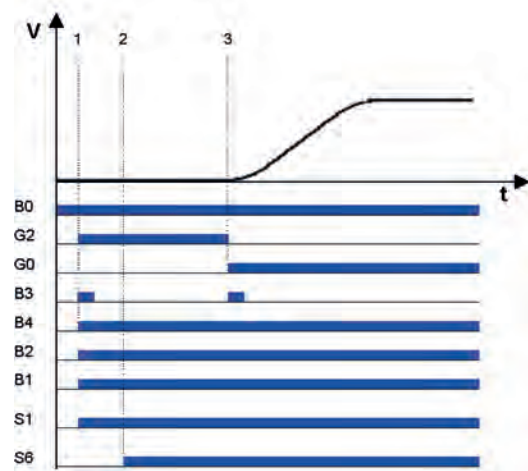
#### Caution!

Danger from traveling with cabin door open!

To prevent premature starting in the event of a defective input, a fractured wire or an incorrect telegram via CANOpenLift or DCP for the "Stop speed 0" function, the travelling speed signals should only be connected after deactivation of the "Stop speed 0" function.



Quickstart with standard actuation  
*RF* Controller enable  
*v=0* Hold speed 0  
*V1* Positioning speed  
*V3* travel speed  
*RV1 / RV2* Direction  
*RB* Controller ready  
*MB\_Brake* Mechanical brake



Quick start with DCP actuation  
*B0* Converter enable  
*B1* Travel command  
*B2* Off switch  
*B3* travel speed  
*B4* Direction  
*S1* Travel active  
*S6* Mechanical brake  
*G2* Speed 0  
*G7* High speed

### 13.15.2 Monitoring functions for Quickstart

- If the drive is held at a speed of 0 for longer than 20 s the frequency inverter enters failure mode and displays the error **ERR780/Quickstart > 20s**
- If the input signal "hold speed 0" is set during travel, the frequency inverter enters fault mode and displays **ERR781/Quick. during travel**
- If the motor moves by more than  $\pm 7$  mm with the input set to speed 0, the ZAdyn4Bplus goes to fault mode, displaying **ERR529 / Quickstart Alarm**
- The monitoring time for the rotary encoder (T\_GUE) is started after the function "Speed 0" has been switched off

## 14 Emergency evacuation

### 14.1 General

- In the event of a mains failure, there is the possibility to carry out an emergency evacuation.
- By carrying out the emergency evacuation, the elevator cabin is driven into a floor or the ground floor.

### 14.2 Evacuation with 3-phase mains supply 3~400 VAC

#### 14.2.1 General

##### Requirements:

- For the emergency evacuation with 3-phase mains supply, the mains supply must provide the following voltage to the frequency inverter:
  - 3~400 VAC to feed L1, L2 and L3.



##### Information

An emergency evacuation with single-phase mains supply (AC) or with power supply by batteries (DC) is not possible.

##### Characteristics of evacuation with 3-phase mains supply:

- Evacuation in motoric and generatoric direction
- Load-independent starts
- Load-independent stopping
- Flush stopping

##### Emergency evacuation process:

- The ZAdyn4Bplus analyses the load ratio between the car and the counterweight during start for every journey.
- According to the load ratio, the ZAdyn4Bplus transmits to the control, in which direction the evacuation trip could be carried out more energy-efficiently.
- The control system starts the evacuation trip by activating:
  - Controller enable
  - Direction
  - Speed default

##### Size of the voltage supply

The required performance consists of the following:

- Power consumption for ZAdyn4Bplus electronics
- + Control system power consumption
- + Electromechanical brakes power consumption
- + Other consumers (car light, ...) power consumption
- + Motor power consumption during motoric operation with sufficient power (ask motor manufacturer)
- = **Real power [W]**



##### Information

The shaft efficiency has a decisive influence on the required power of the three-phase mains supply.

### 14.2.2 Parameterization

#### (1) The following prerequisites must be present:

The direction of travel of the car is downwards with

Standard	DCP	CANopenLift
24 V signal on input configured to "RV2"	Command byte 1, Bit 4 has 1-signal	Evacuation direction object 0x6049

#### Detection of voltage drop

Configure digital input in the **Control system** menu to **PARA2**.

```
Brake Control
↳ f_I08 PARA2
↳ PARA2
Function I_08
```

In case of a power failure, the input configured for 24 VDC is actuated in order to inform the frequency inverter that a switchover to parameter set 2 is necessary.

#### (3) Inform the open loop control about the permissible direction of travel (optional):

Standard	DCP	CANopenLift
<p>In the <b>Control</b> menu, configure the digital output to <b>Evac.Dir</b></p> <pre>Brake Control ↳ f_O4 Evac.Dir. ↳ Evac.Dir. Function O4</pre> <p>Contact open → Car is lighter than counterweight <b>Evacuation trip will be carried out upwards!</b></p> <p>Output closed → Car is heavier than counterweight <b>Evacuation trip will be carried out downwards!</b></p>	<p>Status byte 2, Bit 2 = 0 → Car is lighter than counterweight <b>Evacuation trip will be carried out upwards!</b></p> <p>Status byte 2, Bit 2 = 1 → Car is heavier than counterweight <b>Evacuation trip will be carried out downwards!</b></p>	<p>Object query 0x6049 Evacuation direction by control</p> <p>Value 1 -&gt; Car is lighter than counterweight, evacuation travel upwards.</p> <p>Value 2 -&gt; Car is heavier than counterweight, evacuation travel downwards.</p>

#### (4) Evacuation type default

Configure the parameter **F\_PARA2 = EVA. 3\*AC** in the **Parameter set 2** menu.

```
Parameterset2
↳ F_PARA2 EVA. 3*AC
↳ EVA. 3*AC
Function parameterset 2
```

#### (5) Copying the parameters:

In the menu **Parameter set 2 / COPY**, select the function **PARA->2**. After copying, the parameter is once again OFF.

```
Parameterset2
↳ COPY Off
↳ Para1→2
Copy parameter
```



#### Information

The power failure detection and type of evacuation must be parameterised before copying the parameters. It is possible to reduce the required power during the evacuation. The values for speed and acceleration have to be adjusted in the 2.nd parameter set for this.

### 14.3 Emergency evacuation by opening the brakes

Emergency evacuation through manually or electrically opening the motor brakes until the cabin has reached the next floor in the direction of the pulling load.

If emergency evacuation is performed by opening the brakes on synchronous motors, short-circuiting the motor windings for evacuation is recommended to prevent uncontrolled acceleration of the elevator. The short-circuit generates a speed-dependent brake torque which is sufficient in most cases to limit the elevator speed to a safe level.

- If the ZAdyn4Bplus is operated without contactors, the short-circuit is made by the internal short-circuit of the ZAdyn4Bplus.
- If the ZAdyn4Bplus is operated with contactors (optional), the short-circuit is made by external contactors.

CAUTION!

#### Caution!

Short-circuiting of the motor windings must be permitted by the motor manufacturer. This is tested and guaranteed for ZIEHL-ABEGG motors.

#### 14.3.1 Monitor function

Monitoring of evacuation direction and evacuation speed during the evacuation process. The monitoring function will be activated by a digital input.

```
Brake Control
↳ f_I08 41:Monitor
  ↳ 41:Monitor
Function I08
```

Configure the digital input in the **Control system** menu to the function **41:Monitor**.

#### Activating of the monitoring function

- Switch off the ZAdyn4Bplus
- activate the digital input with the "Monitoring" function
- Switch on ZAdyn4Bplus
- Monitoring function is active

<pre>Elevator-Monitor Speed: 0,2m/s Direction: up ▲ Distance: +1.24m</pre>	<p><b>Elevator-Monitor</b></p> <p><b>Speed:</b> Display of the actual evacuation speed</p> <p><b>Direction:</b> Display of the actual evacuation direction</p> <p>▲ Evacuation speed &lt; Limit V_G1          ▲▲ Evacuation speed &gt; Limit V_G1</p> <p><b>Distance:</b> Display of the evacuation distance past</p>
--	---



#### Information

With activated monitor function, all further functions of the ZAdyn4Bplus are locked!



## 14.4 Stutter brake function

### 14.4.1 General

The stutter brake function can be used for an emergency evacuation with electric manually vented brakes. The function brakes the movement of the elevator cabin and prevents uncontrolled acceleration.

### 14.4.2 Operation modes

The stutter brake function works in two ways:

- Speed-dependent cycle
- time cycle

#### Speed-dependent cycle

The digital output configured for the **Stutter br.** function is switched depending on the limit value  $V\_G1$ .

The speed-dependent cycle includes the following steps, which are repeated in turn:

- If the speed of the elevator cabin exceeds the limit value configured in the parameter  $V\_G1$ , the contact for the digital output is opened.
- The brake is closed.
- The speed falls below the limit value.
- The contact is closed.
- The brake is opened.
- The limit value is exceeded.

The speed-dependent cycle is carried out automatically if

- an emergency rescue is performed and, at the same time,
- the rotary encoder is functional

#### Time cycle:

The digital output configured for the **Stutter br.** function is switched based on time. This opens and closes the brake at a frequency of 0.5 Hz.

The time cycle is carried out automatically if

- the elevator installation is stopped or
- the rotary encoder is defective

At the same time

- the brake release monitor must be deactivated or
- the brake release monitor must be activated and the microswitch or the inductive proximity switches for the brake must report to the ZAdyn4Bplus that the brake is open.

### 14.4.3 Parameterization

To activate the stutter brake function, a digital output in the **Control** menu is configured to the **Stutter br.** function.

```
Brake Control
↳ f_01 BR Info
  ↳ Stutter br.
Function 04
```

The limit value  $V\_G1$  is entered in the parameter **Control/V\_G1**. It is recommended to set the limit value  $V\_G1$  to 0.06 m/s.

```
Brake Control
↳ V_G1 0.3 m/s
  ↳ 0.06
Limit value 1
```

The cabin speed can be changed by adjusting the parameter **Control/V\_G1**.

**14.4.4 Circuit suggestions**

The following circuit suggestions are available at [www.ziehl-abegg.com/service/downloads](http://www.ziehl-abegg.com/service/downloads):

- Stutter brake ZAdyn4 (principle circuit diagram), drawing number: ZD4C01K10
- Stutter brake ZAdyn4 + ZAsbc4 (principle circuit diagram), drawing number: ZD4C01K11
- Stutter brake ZAdynpro + ZAsbc4B, drawing number: ZD4B01K2

**15 Error diagnosis**

**15.1 Travel abort and acknowledgement during malfunctions**

**15.1.1 Travel abort**

If the ZAdyn4Bplus detects an error, the current travel program is aborted and following outputs are switched off immediately:

- ST – Malfunction
- RB – Controller ready (STO / motor contactors)
- MB – mechanical brake

The open loop control must immediately:

- Close the electromechanical brake
- STO- interruption or opening of the motor contactors

The drive is decelerated by the brake torque of the mechanical brake.

The error that has occurred is shown in the display with error text and error number. LED's, error memory and an error list are available for additional troubleshooting.

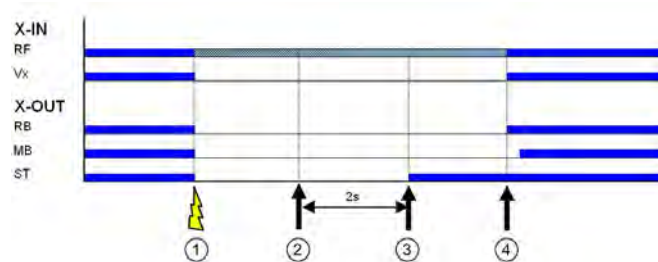
**15.1.2 Acknowledgement**

Acknowledging the error is performed automatically 2 seconds after the cause of the error has been eliminated.

The prerequisite is that the input signals for traveling speeds are applied. No error acknowledgement is issued traveling signals are applied before the expiration of the 2 seconds.

The following errors are not automatically acknowledged:

Error no.	Acknowledgement by
900 ... 999	Switch ZAdyn4Bplus off and then back on



- 1 Error is recognized
- 2 Error is no more present
- 3 Automatic acknowledgement with  $V_x=0$
- 4 New travel command

## 15.2 LED

The CU unit of the ZAdyn4Bplus features an LED for diagnosis.



1 Location of LED for ZAdyn4Bplus

### Status of the ZAdyn4Bplus with standard actuation

LED colour	LED status	Operation condition
green	flashing once per second	Standstill
green	flashing twice per second	Travel

### Condition of the DCP connection

LED colour	LED status	Operation condition
red	fast flashing	With activated DCP function, the DCP connection is not present or is defective
green	On	With activated DCP function, the DCP connection is flawless
red / green	Slow alternating flashing	The DCP function is not activated in a trouble-free DCP connection (only DCP3/DCP4)

### Condition of the CAN connection

LED colour	LED status	Operation condition / error status
green	flashing once per second	Operation Mode "Stopped"
green	fast flashing	Operation Mode "Preoperational"
green	On	Operation Mode "Operational"
red	Off	no error, connection is in order
red	flashing once per second	CAN error counter has exceeded the warning limit of 96 errors
red	On	Bus off, reset of the controller is necessary

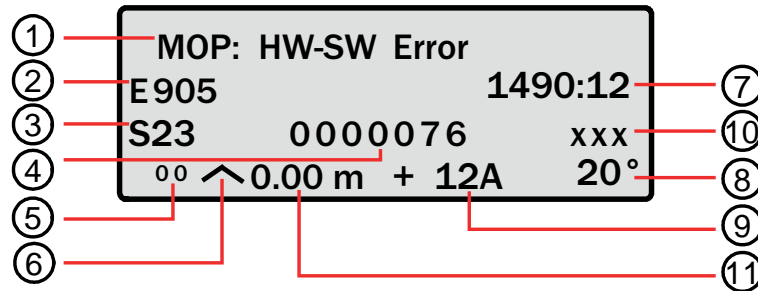
It is possible, that an operation condition and an error state occur at the same time and that they are indicated by the LED at the same time.

**15.2.1 Software update**

If an error occurs during the software update, a flash code is issued by LED for the corresponding error message.  
 An explanation of the flash code can be found in the chapter Special Functions/Software Update

**15.3 Readout the error memory**

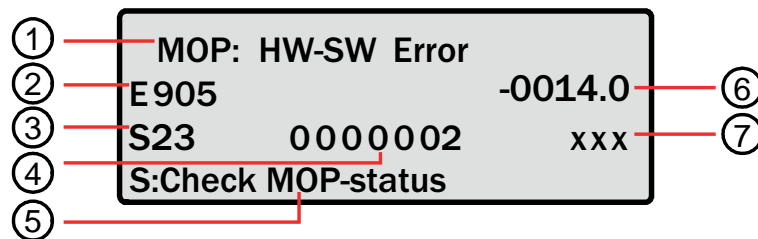
Faults which lead to interruption of the travel are saved in a fault list.  
 The fault list can be found in menu **Statistik/ST\_LST**. Up to 64 error messages can be managed.  
 Once the number of 64 messages has been reached, the oldest entry in each case is deleted for each new error message which arises. When the fault list is called up, the last fault which occurred is displayed with the following information:



- 1 Error description
- 2 Error no.
- 3 Operation condition (S=status)
- 4 Travel number
- 5 Consecutive error number
- 6 Travel direction
- 7 Operating hours
- 8 Temperature power stage
- 9 Motor current consumption
- 10 Additional information (option)
- 11 Position of the car in the shaft

Please refer to the "Error diagnosis" chapter for a description of the error number and the operating status.

If the error list is open and the key is pressed, the following information is displayed:



- 1 Error description
- 2 Error no.
- 3 Operation condition (S=status)
- 4 Indication how many trips ago the error occurred
- 5 Status in which the error occurred is in plain text
- 6 Time how long ago the error occurred
- 7 Additional information (option)

**Scroll through fault list:**

the fault list can be scrolled through using the two arrow keys.



Scroll up (reduce fault serial number)



Scroll down (increase fault serial number)

**Determine time of fault**



When i key is pressed, the difference from the current number of travels and operation time is displayed

```

▷ BC: Alarm/fault ◀
E912 S422 -2.4h
-0000189 12C
▷ 01 RV1 0.00m +12A
    
```

In CANopen lift and DCP operation, the time and date when an error occurs are saved in the error list and displayed.

MOP: HW-SW Error			
E905	22.02.2016	10:30	
S23	0000076	XXX	
00	0.00 m	+ 12A	20°

- 1 Date when the error occurred
- 2 Time at which the error occurred

**Information text display**

If an error message is displayed or the error list is opened, an information text about the error message can be displayed. To do this, press the i key. The prerequisite is that a memory card on which the information texts are saved is inserted in the X-MMC card slot.

**15.4 Delete error memory**

The fault memory is wiped by means of an entry in the **Statistic/ST\_CLR=ON**.

The following parameters are reset:

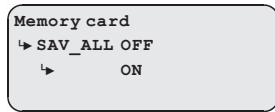
- ST\_LST (Error list)
- ST\_RES (Number of interruptions in the mains supply)
- ST\_SRF (Number of trip interruptions due to an interruption in the control enabling)
- ST\_SCO (Number of trip interruptions due to an interruption in the contactor monitor)

**15.5 Recorder function**

The recorder function records measuring channels during travel. This makes it easier to determine the cause of an error if any errors should occur. The measurements can be saved in a zr4 file on the memory card.

If an error occurs during travel, the zr4 file is automatically saved if there is an SD card in the X-MMC card slot and there is no memory card in the ZApad card slot.

Saving the Zr4 file: After travel, configure the **Memory Card/SAV\_ALL=On** parameter



## 15.6 Error list

### 15.6.1 Mask-function

You can deactivate individual monitoring functions by inputting an item in the error mask (see "Parameter list/Monitoring" menu chapter). To do this, enter the corresponding error number into error masks 1-5.

The maskable errors are marked in the error list with a **point** in the column **M**.

**CAUTION!**

**Caution!**

The mask function may only be used for troubleshooting and error diagnostics. The corresponding error cause must be eliminated in order to ensure continuous service of the frequency inverter!

Sequential errors can occur if errors are masked.

The masking deactivates important monitoring functions. This may result in dangerous operating states or damage to the inverter.

### 15.6.2 Negative error screen

Inactive errors can be activated by entering the corresponding error number in the negative error screen (see "Parameter list/Monitoring menu" chapter). The inactive errors are indicated by a note in the error list.

### 15.6.3 Block function

Blocks the ZAdyn if certain errors occur several times in succession. The errors must occur in directly consecutive travel tests. The fault counter is reset to 0 after completion of fault-free travel.

The following block functions can be set in the **Monitoring / MOD\_ST** menu:

- Fix 2 Sec.: No blocking function, the output configured on "ST" drops for 2 seconds during a malfunction and then increases again (speed preset V\_x must be switched off)
  - Lock n.3: Lock function after 3 malfunctions. Output "ST" remains dropped after the 3rd error
  - Lock n.2: Lock function after 2 malfunctions. Output "ST" remains dropped after the 2nd error
  - Lock n.1: Lock function after 1 malfunction. Output "ST" remains dropped after the 1st error
- Errors which lead to locking of the ZAdyn4Bplus are identified by a **dot** in the **S** column.

### 15.6.4 Notes 0xx

Information about:

- Error memory content
- Changes in the operating statuses
- Application of special frequency inverter functions

Note-No.	Note text	Designation	M	S
000	Memory empty	EEPROM is empty		
001	No error text	EEPROM is empty		
010	Software update	Software update was carried out		
020	MOT_TYP changed	On ZAdynpro only. Motor type has been changed in the "Motor name plate" menu		
040	Line Fault	On ZAdyn4Bplus only. <b>Cause:</b> A phase of the supply network was not detected 30s after switching on <b>Remedy:</b> Check line voltage		
077	ST_LST: locked	The last error entered occurred more than 5 times in succession	•	
080	Mode: EVA ->Norm	Switchover from evacuation to normal mode was implemented		

Note-No.	Note text	Designation	M	S
081	Mode: Standard->EVA	Switchover from normal to evacuation to mode was implemented		
085	Mode: Safety Brk	Capture release (safety brake function)performed		•

### 15.6.5 Error 1xx

- Hardware configuration error
- Software error

Error no.	Error text	Error cause	M	S
108	HW-IDENT:Incorrect no.”,	<b>Cause:</b> The ID no. of an assembly is not known <b>Remedy:</b> Update software (www.ziehl-abegg.com)		
110 120	CU: No ID	<b>Cause:</b> ID no. of processor board (CU) is not recognised <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
111	CUSH missing	<b>Cause:</b> ID no. of the shunt module (CUSH) is not recognised <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
115 125	SP missing	<b>Cause:</b> ID no. of the switching power supply board (SP) is not recognised <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
116 126	PP missing	<b>Cause:</b> ID no. of the power unit board (PP) is not recognised <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
117 127	MP missing	<b>Cause:</b> ID no. of the power unit board (MP) is not recognised <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
118	PU missing	<b>Cause:</b> ID no. of the power unit board (PU) is not recognised <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
119	DC missing	<b>Cause:</b> ID no. of the DC-link board (DC) is not recognised <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
121	CUSH: ID-Error	<b>Cause:</b> Prohibited combination of assemblies (CUSH) <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
130	Hardware unknown	<b>Cause:</b> The ID no. of an assembly is not known <b>Remedy:</b> Update software (www.ziehl-abegg.com)		
131	INFB conflict	<b>Cause:</b> The ID no. of an assembly is incorrect <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
140	MP:Unknown IGBT	<b>Cause:</b> Unknown IGBT module <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
150	HW conflict	<b>Cause:</b> Assemblies (SH, PP, MP) are not compatible <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service		
160	ADC adj.:outside tol.	<b>Cause:</b> Incorrect measured values from current recording during switch-on <b>Remedy:</b> Switch the ZAdyn off and back on. Please contact ZIEHL-ABEGG Customer Service	•	
174	CUMT:Not detect	<b>Cause:</b> Board for monitoring the motor temperature is not recognised. <b>Remedy:</b> Check that the board is installed correctly. In the “Monitoring” menu, set the parameter “P1P2 = Off”. Replace the board	•	•

### 15.6.6 Error 2xx

- Configuration error

Error no.	Error text	Error cause	M	S
200	Stop input	<b>Cause:</b> When activating a travel command using the elevator control, a parameter for changing the speed is selected <b>Remedy:</b> End parameter inputs	•	
201	Motor name plate	<b>Cause:</b> A parameter in the “Motor name plate” menu is set to “0” <b>Remedy:</b> Check the parameter in the “Motor name plate” menu,		
203	n* = 0	<b>Cause:</b> In the “Installation data” menu, the “n*” parameter is set to “0” <b>Remedy:</b> Enter the “n*” parameter		
205	Input duplicated	<b>Cause:</b> Two digital inputs are assigned the same function <b>Remedy:</b> Correct the function allocation of the digital inputs in the “Control system” menu		

Error no.	Error text	Error cause	M	S
206	$n^* > 1.2204 \cdot n$	<b>Cause:</b> The calculated motor speed "n*" in the "Installation data" menu is at least 20% above the set nominal speed "n" in the "Motor name plate" menu for the motor <b>Remedy:</b> Check system data Check motor data	•	
207	Input PFU_BR miss.	<b>Cause:</b> When using a power recuperation unit in conjunction with a brake resistor temperature monitoring of the brake resistor is not programmed <b>Remedy:</b> Configure a digital input (preferably "X_BR4") in the "Control system" menu to the "PFU_BR" function		
208	DELAY active	See error 355 "FastStp active".		
210	Wrong ENC_TYP	<b>Cause:</b> Rotary encoder type (motor) and motor type do not match <b>Remedy:</b> Enter the correct rotary encoder type for the "ENC_TYP" parameter in the "Encoder & BC" menu Enter the correct motor type for the "MOT_TYP" parameter in the "Motor name plate" menu	•	
213	ZR_EN /ZR_RDY missing	<b>Cause:</b> When using a ZArec4C power recuperation unit, the "ZR_RDY" or "ZR_EN" functions have not been configured <b>Remedy:</b> In the "Control system" menu, configure a digital input to the "ZR_RDY" function In the "Control system" menu, configure a digital output to the "ZR_EN" function		
215	No HIPER/CODEFACE	<b>Cause:</b> An absolute encoder (motor) with Hiperface or Codeface interface has been selected - these encoder types cannot be used with the ZAdyn4Bplus <b>Remedy:</b> In the "Encoder & BC" menu, set the "ENC_TYP" parameter to the correct absolute encoder Replace the absolute encoder on the drive		
220	Error: SM data	<b>Cause:</b> In the "Motor name plate" menu, the values for the rated speed "n" and the rated frequency "f" are contradictory <b>Remedy:</b> Correct the "n" and "f" parameters ( $n = f \times 60 / p$ )	•	
221	Error:ASM data	<b>Cause:</b> In the "Motor name plate" menu, the values for the rated speed "n" and the rated frequency "f" are contradictory <b>Remedy:</b> Correct the "n" and "f" parameters	•	
231	$V_{G1} > 150\% V^*$	<b>Cause:</b> In the "Control system" menu, the configured limit value "V_G1" is too high <b>Remedy:</b> Configure the limit value "V_G1" to max. 150% of the value of "V*" ("Installation" menu)		
232	$V_{G2} > 150\% V^*$	<b>Cause:</b> In the "Control system" menu, the configured limit value "V_G2" is too high <b>Remedy:</b> Configure the limit value "V_G2" to max. 150% of the value of "V*" ("Installation" menu)		
233	$V_{G3} > 150\% V^*$	<b>Cause:</b> In the "Control system" menu, the configured limit value "V_G3" is too high <b>Remedy:</b> Configure the limit value "V_G3" to max. 150% of the value of "V*" ("Installation" menu)		
240	ZR:Not RDY	See error 345 "ZR: Not RDY".		
250	Disc: No Enc Adj.	See error 341 "Disc: No Enc Adj.".		
251	Disc: Wrong ENC_INC	<b>Cause:</b> An invalid value has been set for the "ENC_INC" parameter (motor rotary encoder) in the "Rotary encoder & BC" menu <b>Remedy:</b> Correct the "ENC_INC" parameter	•	
252	Disc:Enclnc deviance	See error 552 "Disc:Enclnc deviance"		
260	V_EXT active!	See error 360 "V_EXT active".		
270	Cable change warning	See error 370 "Cable change warning".		
280	Decel. distance too long	<b>Cause:</b> The calculated deceleration path from travelling speed "V_3" to a standstill (S30) is too long <b>Remedy:</b> Increase the deceleration "A_NEG" in the "Deceleration" menu In the "Deceleration" menu, reduce the roundings "R_NEG1" and "R_NEG2" In the "Travel" menu, reduce the travelling speed "V_3"		



Error no.	Error text	Error cause	M	S
281	UF: No Pos. Mode	<b>Cause:</b> U/f operation (without encoder) in conjunction with CAN position mode or DCP04 control is not permissible <b>Remedy:</b> Change the "Config" parameter to DCP03 in the "Control system" menu Change the control type in the elevator control to CAN Velocity mode	•	
284	CC_OFF is on	<b>Cause:</b> The travel curve computer is switched off <b>Remedy:</b> In the "ZA-Intern" menu, set the "CC_OFF" parameter to "OFF"	•	
285	Installation:V*=0	<b>Cause:</b> In the "Installation data" menu, the "V*" parameter is set to "0" <b>Remedy:</b> Enter the "V*" parameter		
287	V_1...V_7 > V*	<b>Cause:</b> In the "Travel" menu, one of the travelling speeds "V_1 ... V_7" is higher than the nominal speed "V*" set in the "Installation data" menu <b>Remedy:</b> Check speeds "V_1 ... V_7" Check "V"		
289	V_1 < V_2 < V_3	<b>Cause:</b> Speeds are set incorrectly in the "Travel" menu <b>Remedy:</b> Set "V_1" to less than "V_2" Set "V_2" to less than "V_3"	•	
290	Para.set2 empty	<b>Cause:</b> Parameter set 2 was not preallocated before activation <b>Remedy:</b> In the "Parameter set 2" menu, set the "F_PAR2" parameter to the desired operating mode		

### 15.6.7 Error 3xx

- Error before trip start

Error no.	Error text	Error cause	M	S
301	MOP: Timeout	<b>Cause:</b> There is no communication between the application and motor management processor during start-up <b>Remedy:</b> For sporadic occurrence: Check EMC-compatible installation (screening, etc.) For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
303	MOP: SW-Error	<b>Cause:</b> Software error message from the motor management processor <b>Remedy:</b> Switch the ZAdyn off and back on Reset ZAdyn to delivery condition: Enter the "RESET = 77" parameter in the "Statistics" menu Perform a software update	•	•
304	MOP: HW-Error	<b>Cause:</b> Overvoltage detected in DC-link Memory error Error in measured value recording <b>Remedy:</b> Switch the ZAdyn off and back on Reset ZAdyn to delivery condition: Enter the "RESET = 77" parameter in the "Statistics" menu Perform a software update	•	•
306	ADC calibration??	<b>Cause:</b> Zero point adjustment for motor current detection (analog-digital converter) is outside of tolerance <b>Remedy:</b> Switch the ZAdyn off and back on Replace defective shunt module	•	•
308	Iu Iv not 0A	<b>Cause:</b> A motor current is measured even when stopped Current detection defective <b>Remedy:</b> Check shunt module Switch the ZAdyn off and back on	•	•
310	ENC: No AWG	<b>Cause:</b> The absolute encoder (motor) was not recognised at the start of travel <b>Remedy:</b> Check the connection of the absolute encoder Check the setting for the "ENC_TYP" parameter in the "Encoder & BC" menu for further information, see the "Rotary encoder" info menu	•	•
311	ENC:Resolution	<b>Cause:</b> In the "Encoder & BC" menu, the "ENC_INC" parameter setting does not match the resolution of the absolute encoder (motor) <b>Remedy:</b> Set "ENC_IN" to the correct resolution for further information, see the "Rotary encoder" info menu		

Error no.	Error text	Error cause	M	S
312	HIPER:Status error	On ZAdyn4C and ZAdyn4Bplus only. See error 336 "ENC: Faulty"		
313	HIPER:No incr. mode	On ZAdyn4C and ZAdyn4Bplus only. See error 336 "ENC: Faulty"		
314	HIPER:Alarm	On ZAdyn4C and ZAdyn4Bplus only. See error 335 "ENC: Warning"		
321	EnDat: ULP-error	See error 335 "ENC: Warning"		
322	EnDat: Com-Fehler	See error 337 "ENC:Comm. Error".		
324	SSI: Ack-Error			
325	SSI: Timeout			
327	ENC: Read-Error			
328	ENC: Count-Dif		<b>Cause:</b> Excessive difference between the absolute position read out and the position calculated from the pulses <b>Remedy:</b> Check absolute value encoder Check rotary encoder line Check rotary encoder connection (e.g. shielding)	
330	ENC:Sinus-Error F	See error 337.		
331	ENC: Error NDEF	<b>Cause:</b> Faulty communication with absolute encoder (motor) <b>Remedy:</b> Check the absolute encoder cable Check the absolute encoder type connected Check EMC-compatible installation of system (screening of motor and BR cable) for further information, see the "Rotary encoder" info menu		•
332	ENC: 1387 CD=0	<b>Cause:</b> Input voltages for signal tracks C and D of the absolute encoder type ERN1387 are both zero <b>Remedy:</b> Check absolute value encoder Check rotary encoder line Check rotary encoder connection		
333	ENC:Ill. Counter	<b>Cause:</b> The absolute value determined (motor rotary encoder) is invalid <b>Remedy:</b> Switch the ZAdyn off and back on Check the "ENC_TYP" and "ENC_INC" parameters in the "Encoder & BC" menu for further information, see the "Rotary encoder" info menu		•
335	ENC: Warning	<b>Cause:</b> The absolute encoder (motor) is transmitting a warning which indicates an imminent failure <b>Remedy:</b> The absolute encoder must be replaced as quickly as possible In the "Monitoring" menu, one of the "MASKx" parameters can be temporarily set to 335 to mask the error	•	•
336	ENC: Faulty	<b>Cause:</b> The absolute encoder (motor) is probably faulty <b>Remedy:</b> Switch the ZAdyn off and back on Replace the absolute encoder		•
337	ENC: Comm. Error	<b>Cause:</b> Faulty communication with absolute encoder (motor) <b>Remedy:</b> Check the "ENC_TYP" and "ENC_INC" parameters in the "Rotary encoder & BC" menu Check the connection of the absolute encoder Check EMC-compatible installation (screening of rotary encoder cable, motor cable, BR cable, etc.) for further information, see the "Rotary encoder" info menu Contact the ZIEHL-ABEGG hotline Replace the absolute encoder		•
340	Disc:magnet miss.	<b>Cause:</b> A magnet in the DISCcontrol positioning system was not detected at the expected position during the previous travel <b>Remedy:</b> Stick on the magnet in the right position Attach any magnet that may have dropped off Set the Hall sensor to the correct distance Check the clearance of the traction sheave bearing	•	•

Error no.	Error text	Error cause	M	S
341	Disc: No Enc Adj.	<b>Cause:</b> Magnet adhesion process was not performed <b>Remedy:</b> In the "Rotary encoder adjustment" menu, select the "ENC_ADJ" parameter and perform the magnet adhesion process		
345	ZR: Not RDY	<b>Cause:</b> There is no signal at the digital input configured for the "ZR_RDY" function at the start of travel <b>Remedy:</b> Exit the ZAreC configuration level Check whether there is an error on the ZAreC In the "Encoder & BC" menu, check the "BC_TYP = ZAreC" parameter Check the wiring between ZAdyn and ZAreC		
346	BR: T2 too small	<b>Cause:</b> The brake is not detected as open at the start of travel Brake does not open Brake release monitoring switch does not switch <b>Remedy:</b> Check brake release monitoring Check brake actuation Check the opening time of the brakes In the "Start-up" menu, check the "T_2" parameter and increase if necessary Check the configuration of the brake release monitoring ("Monitoring" and "Control system" menu)	•	•
347	CO: ON!?	<b>Cause:</b> The motor contactors are not detected as closed at the start of travel Motor contactors do not switch Auxiliary contacts of the motor contactors do not switch <b>Remedy:</b> Check contactor monitoring Check the wiring of the motor contactors Check the supply voltage to the motor contactors Check the contactor monitoring supply voltage In the "Monitoring" menu, check the "CO" parameter	•	•
348	STO: remains	<b>Cause:</b> At the start of travel, after 2.5 s, there are no STO_A and STO_B signals at the X-STO connection terminal <b>Remedy:</b> Check the control wiring Check the relay supply voltage Check the control voltage of the STO signals When using the ZAsbc4: Reset the ZAsbc4 by switching it off and back on		•
349	STO: No trav. sig.	<b>Cause:</b> After actuation of the STO_A and STO_B inputs, no elevator control travel signal was registered within 2.5 s <b>Remedy:</b> Check the elevator control with regard to travel signals Check actuation of the STO inputs With parallel control, check the wiring of the digital control inputs Check the status of the serial control (CAN, DCP) using the status LED on the ZAdyn		
350	Temp:Sens defective	<b>Cause:</b> The temperature sensor for the power unit is not detected. The ZAdyn carries out further journeys with a reduced PWM frequency of 4 kHz and maximum fan power <b>Remedy:</b> Not possible, replace ZAdyn as soon as possible Contact the ZIEHL-ABEGG hotline	•	
355	FastStp active	<b>Cause:</b> The "Limited emergency stop" function is already active at the start of travel <b>Remedy:</b> Check the setting of the digital inputs in the "Control system" menu Check the control and wiring of the input for the "/FastStp" function		•
360	V_EXT active	<b>Cause:</b> When connected to line voltage, the external 24 VDC voltage supply to the processor board (CU) exceeds the internal voltage supply by 1 VDC <b>Remedy:</b> Remove the external 24 VDC voltage supply Reduce the voltage of the external 24 VDC	•	•
365	Travel at MB=OFF	<b>Cause:</b> Movement of the drive is detected although the "MB" output is deactivated <b>Remedy:</b> Check the motor brake for sufficient brake torque Check the dropout time of the brake The motor brake must be actuated at the same time as the relay for the "MB" output function is switched	•	•

Error no.	Error text	Error cause	M	S
370	Suspension means warning	<b>Cause:</b> Direction change counter information The suspension means must be replaced in approx. 1 year <b>Remedy:</b> Replace the suspension means before the direction change counter has reached zero	•	
372	ENC:No Abs.value	See error 337 "ENC:Comm. Error".		
373	ENC:No Abs.End			
374	P1P2:short-circuit	<b>Cause:</b> The measured resistance at the "X-MT" terminal is less than 20 Ohm when "P1P2 = PTC" motor temperature monitoring is set in the "Monitoring" menu <b>Remedy:</b> Check the motor temperature monitoring connection Check the "P1P2" parameter in the "Monitoring" menu	•	
375	MOT:Temp.warning	<b>Cause:</b> The determined motor temperature is too high at the start of travel <b>Remedy:</b> Check the temperature sensor (motor) connection at terminal X-MT Check whether there the motor is overheating Remedy the cause of the motor overheating (reduce duty cycle, check load ratios in the system, check motor parameters, adjust the absolute encoder on synchronous machines, cool the motor etc.)	•	
376	STO: Temp. alarm	See error 976 "STO: Temp. alarm"		
377	BRxx:Temp.warning	<b>Cause:</b> The calculated power loss of the brake resistor exceeds the nominal power by 25 % <b>Remedy:</b> Check the "BC_TYP" parameter in the "Encoder & BC" menu If "BC_TYP" = "BRxx" in the "Encoder & BC" menu, check the "R_BR" and "P_BR" parameters Remedy the cause of the resistor overload (reduce duty cycle, check the load ratios in the system etc.)		
378	MP: Not active	<b>Cause:</b> The voltage supply to the power unit was not active at the start of travel <b>Remedy:</b> Contact the ZIEHL-ABEGG hotline		•
379	MP:Temp.warning	<b>Cause:</b> The temperature of the power unit is too high at the start of travel <b>Remedy:</b> Check the function of the unit fan Check the ambient temperature Remedy the cause of overheating (reduce duty cycle, check load ratios in the system, check motor parameters, adjust the absolute encoder on synchronous machines etc.)	•	
380	BR: Start-Error	<b>Cause:</b> At least one brake is detected as released before the start of travel when brake release monitoring is activated <b>Remedy:</b> In the "Monitoring" menu, check the "BR" parameter to make sure the correct number is set and check the switching logic (NO / NC) of the monitoring contacts Check that the monitoring contacts are connected correctly Check the function of the monitoring contacts		•
395	MP:ERR_EXT active	<b>Cause:</b> An internal device error occurs at the start of travel <b>Remedy:</b> Switch the ZAdyn off and back on Contact the ZIEHL-ABEGG hotline	•	•

15.6.8 Error 4xx

- Travel abort to protect the ZAdyn4Bplus
- Voltage monitoring
- Overvoltage Brake resistor / Brake-Chopper
- Power stage temperature recording
- Current monitoring

Error no.	Error text	Error cause	M	S
410	ADC:Overcurrent	<p><b>Cause:</b> A motor overcurrent has been detected</p> <p><b>Remedy:</b> Check the motor connection for short circuit and earth fault Check the phase sequence of the motor connection (U-&gt;U; V-&gt;V; W-&gt;W) Check the connection and function of the rotary encoder (for further information, see the "Encoder" info menu) Check the absolute encoder adjustment Check the motor data in the "Motor name plate" menu Reduce the "SPD_KP" parameter in the "Controller" menu Reduce the "K_START" parameter in the "Start-up" menu For open loop operation (asynchronous operation without sensors): Configure the <b>Control/UF_ED=On</b> parameter and then gradually increase the <b>Control/I_lxR</b> parameter. Do not exceed a maximum value of 1.5 x nominal motor current!</p>		•
412	MOT: UVW missing	<p><b>Cause:</b> The motor test current was not reached at the start of travel</p> <p><b>Remedy:</b> Check the motor connection and motor cable Contact ZIEHL-ABEGG Customer Service</p>	•	
415	MOT: Current UVW	<p><b>Cause:</b> The sum of the currents U, V, W is not equal to 0</p> <p><b>Remedy:</b> Check the motor connection for short circuit and earth fault</p>	•	•
420	MP: Temp. alarm	<p><b>Cause:</b> Overtemperature on power unit</p> <p><b>Remedy:</b> Check the function of the unit fan Check the ambient temperature Remedy the cause of overheating (reduce duty cycle, check load ratios in the system, check motor parameters, adjust the absolute encoder on synchronous machines etc.)</p>		•
431	MP: PWM fail	<p><b>Cause:</b> Internal device error, pulse width modulation has been switched off</p> <p><b>Remedy:</b> Check rotary encoder connection For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service For sporadic occurrence: Check EMC-compatible installation (screening, etc.)</p>		•
435	MP: PWM on	See error 935 "MP: PWM on"		
450	MP: Overload	<p><b>Cause:</b> The maximum output current of the ZAdyn has been exceeded for more than 10 s</p> <p><b>Remedy:</b> Check the connection and function of the rotary encoder (for further information, see the "Encoder" info menu) Check motor data Check the weight compensation Check opening of the brake (motor) Check the absolute encoder adjustment Check the required motor power and unit size Check that the cabin and counterweight engage easily</p>	•	•
451	MP: Overload	<p><b>Cause:</b> ZAdyn output current was greater than 130 % at a very low speed for 1 s</p> <p><b>Remedy:</b> Check the system for mechanical blockages Check the connection and function of the rotary encoder (for further information, see the "Encoder" info menu) Check motor data Check the weight compensation Check opening of the brake (motor) Check the absolute encoder adjustment Check the required motor power and unit size</p>	•	•

Error no.	Error text	Error cause	M	S
452	MP: Overload	<p><b>Cause:</b> ZAdyn output current was too high for a certain duration (Ilt monitoring). At low speeds and with large variations between the nominal and actual speed, the current is weighted correspondingly higher</p> <p><b>Remedy:</b> Check that car and counterweight engage easily</p> <p>Check the connection and function of the rotary encoder (for further information, see the "Encoder" info menu)</p> <p>Check motor data</p> <p>Check the weight compensation</p> <p>Check opening of the brake (motor)</p> <p>Check the absolute encoder adjustment</p> <p>Check the required motor power and unit size</p>	•	•
470	DC: U < UDC_MIN	See error 970 "DC: U < UDC_MIN".	•	
471	DC: U > UDC_MAX	<p><b>Cause:</b> DC-link voltage has exceeded the maximum voltage during travel</p> <p><b>Remedy:</b> Check the connection, function and design of the brake chopper/-brake resistor,</p> <p>In the "Power unit" menu, check the parameters for "UDC_MAX",</p> <p>In the "Encoder &amp; BC" menu, check the "BC_TYP" parameter</p> <p>In case of poor travel behaviour (vibration), check the "SPD_KP" parameter in the "Controller" menu</p> <p>If the error occurs during deceleration, reduce the "A_NEG" parameter or increase "R_NEG1" in the "Deceleration" menu</p>	•	
472	Failure of a phase	See error 972 "Line failure".		
475	DC: U > 850 V	See error 975 "DC: U > 850V".		
480	MP: Overcurrent	<p><b>Cause:</b> Overcurrent has been detected at the motor output</p> <p><b>Remedy:</b> Check the motor connection for short circuit and earth fault</p> <p>Check the phase sequence of the motor connection (U-&gt;U; V-&gt;V; W-&gt;W)</p> <p>Check the connection and function of the rotary encoder (for further information, see the "Encoder" info menu)</p> <p>Check the absolute encoder adjustment</p> <p>Check the motor data in the "Motor name plate" menu</p> <p>Reduce the "SPD_KP" parameter in the "Controller" menu</p> <p>Reduce the "K_START" parameter in the "Start-up" menu</p> <p>For open loop operation (asynchronous operation without sensors):</p> <p>Configure the <b>Control/UF_ED=On</b> parameter and then gradually increase the <b>Control/I_IxR</b> parameter. Do not exceed a maximum value of 1.5 x nominal motor current!</p>		•
484	MP: Overcurrent R	<p><b>Cause:</b> Overcurrent has been detected at the output for the brake resistor</p> <p><b>Remedy:</b> Check the brake resistor connection for short circuit and earth fault</p> <p>Check the type of brake resistor used (see operating instructions, "Brake resistor allocation" chapter)</p>		•
485	Intermediate circuit overcurrent	<p><b>Cause:</b> The DC-link current sensor has detected an overcurrent</p> <p><b>Remedy:</b> Check the brake resistor connection for short circuit and earth fault</p> <p>Check the type of brake resistor used (see operating instructions, "Brake resistor allocation" chapter)</p> <p>Check the motor connection (short circuit, earth fault)</p> <p>Check rotary encoder connection</p> <p>Disconnect the cables at terminals U, V, W and R and send a travel signal. If the error persists, there is a defect in the unit. In this case, contact ZIEHL-ABEGG Customer Service</p>		•
488	MP: Current recording	<p><b>Cause:</b> An overcurrent was detected before travel</p> <p><b>Remedy:</b> Consult ZIEHL-ABEGG customer service</p>		
497	SW: System check	See error 982 "SW error (T>4.5ms)".		

**15.6.9 Error 5xx**

- Trip abort to protect the installation
- Speed monitoring
- STO function monitor
- Contactor monitor (optional)
- Monitoring of Brake resistor / Brake-Chopper
- Motor temperature monitoring

Error no.	Error text	Error cause	M	S
501	Travel at MB=OFF	See error 365 "Travel with MB=OFF".	•	•
503	No starting	<b>Cause:</b> No rotary encoder signal (motor) has been detected yet after the time "T_ENC" in the "Monitoring" menu has elapsed <b>Remedy:</b> Check opening of the brake Check the time "T_ENC" in the "Monitoring" menu Observe the value "Cnt" in the "Encoder" info menu when turning the motor shaft (e.g. by releasing the brake). As the shaft turns, the value must continuously rise/fall Check rotary encoder connection Check the setting for the "ENC_TYP" parameter in the "Encoder & BC" menu	•	•
504	ENC:Sig.Underv.	<b>Cause:</b> No more signals from the rotary encoder (motor) are detected during travel <b>Remedy:</b> Motor shaft rotating continuously: - Check rotary encoder connection - Observe the value "Cnt" in the "Encoder" info menu when turning the motor shaft (e.g. by releasing the brake). As the shaft turns, the value must continuously rise/fall, Motor shaft stops during travel: - Check whether brake has engaged during travel - For ASM: Check the motor data - Check the motor connection (U-U, V-V, W-W) - Increase the "SPD_KP" parameter in the "Controller" menu	•	•
505	No motor movement	<b>Cause:</b> No signals detected by the rotary encoder (motor) <b>Remedy:</b> Check whether the brake is opening Check motor data Check the motor connection (U-U, V-V, W-W) Increase the "SPD_KP" parameter in the "Controller" menu,	•	•
514	$n > n_{LOAD}$	<b>Cause:</b> Speed is above 110 % of the nominal speed $V^*$ <b>Remedy:</b> Check / increase the "SPD_KP" parameter in the "Controller" menu, Check the motor data in the "Motor name plate" menu	•	•
515	$v > 110\% V^*$	<b>Cause:</b> Speed is above 110% of the nominal speed $V^*$ <b>Remedy:</b> Check / increase the "SPD_KP" parameter in the "Controller" menu, Check the motor data in the "Motor name plate" menu	•	
516	$v > 150\% V^*$	<b>Cause:</b> Speed is above 150% of the nominal speed $V^*$ <b>Remedy:</b> Check / increase the "SPD_KP" parameter in the "Controller" menu, Check the motor data in the "Motor name plate" menu		•
520	Wrong direction	<b>Cause:</b> Drive moves several centimetres in the wrong direction <b>Remedy:</b> Check the motor connection (U-U, V-V, W-W) Check the settings in the "Motor name plate" menu Check rotary encoder connection Reduce the "SPD_KP" parameter in the "Controller" menu Increase the "M_MAX" parameter in the "Motor name plate" menu If the above solutions do not work successfully, replace the wires of the motor cable at connection terminal U and V. Important: In this case, rotary encoder adjustment must be carried out for synchronous drives ("Rotary encoder adjustment" menu, "ENC_ADJ" parameter)	•	•

Error no.	Error text	Error cause	M	S
525	ENC: ADC Limit	<b>Cause:</b> Signal track A, B, C or D of the absolute or sinus encoder has exceeded the permissible limit value during travel <b>Remedy:</b> Check whether a rectangular rotary encoder is connected when the "ENC type" set in the "Encoder & BC" menu is "TTL sine". In this case, set the parameter correctly Check whether the ZAdyn supports the connected rotary encoder (see operating instructions, "Rotary encoder connection" chapter) Replace the rotary encoder	•	•
528	Quickstart? (UPS!) [Schnellstart? (USV!)]	<b>Cause:</b> Travel began with a quickstart even though the ZAdyn is being operated with emergency power via a UPS. Due to the limited power of the UPS, it is not possible to hold speed 0 in this operating mode. <b>Remedy:</b> Switch off the quickstart in the control		
529	Quickstart alarm	<b>Cause:</b> In the quick start function, the drive moves by more than 7 mm while the speed is set to 0 m/s <b>Remedy:</b> Check the motor data in the "Motor name plate" menu Reduce the "SPD_KP" parameter in the "Controller" menu Check the motor connection (U-U, V-V, W-W)	•	•
530	STO: remains	See error 348 "STO: Remains".	•	
531	STO: Interruption	<b>Cause:</b> STO input signals were interrupted during travel. Interruption of the travel in case of signal interruption longer than 200 ms. No interruption of the travel in the event of shorter interruptions, but error entry at the end of travel <b>Remedy:</b> Check the safety circuit Check actuation of the STO inputs Check the relay supply voltage Check the control voltage of the STO signals	•	
532	STO: missing	<b>Error:</b> At the end of travel there is still a signal at the STO_A and STO_B inputs after 2,5 s. <b>Remedy:</b> Check actuation of the STO inputs Adjust the time during which the STO inputs are actuated on the elevator control		•
533	STO: Fault	<b>Cause:</b> The status of the STO_A and STO_B signals was different for longer than 120 ms <b>Remedy:</b> Check actuation of the STO inputs Check the switching function of the relay contacts Check coupling relay actuation	•	•
534	STO: No travel signal	See error 349 "STO:no travel signal".		
535	ZR: RDY abort	<b>Cause:</b> ZAreC error message - the signal at the digital input configured for "ZR_RDY" drops during travel <b>Remedy:</b> Use the ZAreC display to check for an error on the ZAreC For sporadic occurrence: Check EMC-compatible installation (screening, etc.)		•
536	SBC:RDY abort	<b>Cause:</b> The digital input with the "SBC_RDY" function is de-energized during travel or is not set at the start of travel <b>Remedy:</b> See "Error diagnosis" chapter in the operating instructions for the ZAsbc4		•
540	CO: ON!?	See error 337 "CO: Missing".		•
544	CO/RF:Vx active	<b>Cause:</b> Interruption of the travel due to CO interruption, the travel commands from the control remain active <b>Remedy:</b> Check the safety circuit Check contactor actuation Check evaluation of the ZAdyn output signals by the control	•	
545	CO open early	<b>Cause:</b> Interruption of the travel due to CO interruption <b>Remedy:</b> Check the safety circuit Check contactor actuation	•	
548	CO1: still on	<b>Cause:</b> At the end of travel, the contactors are not yet detected as de-energized when the time "T_CDLY" in the "Monitoring" menu has elapsed <b>Remedy:</b> Check the wiring of the contactor monitoring Check contactor actuation Check the function of the contactors		•



Error no.	Error text	Error cause	M	S
550	MOT: Overload !	<b>Cause:</b> Motor current exceeds the value "I_MAX" for the time "T_MAX" in the "Monitoring" menu <b>Remedy:</b> Check the motor data in the "Motor name plate" menu Check the weight compensation Check the brake lifting Check the system design	•	•
552	Disc:Enclnc deviance	<b>Cause:</b> The encoder line count determined has an excessive tolerance <b>Remedy:</b> Check the friction wheel (support, bearing, diameter) Switch the ZAdyn off and back on For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service	•	•
553	Disc:Wrong position	<b>Cause:</b> A magnet has been detected but is not expected <b>Remedy:</b> Check the position of the magnets Switch the ZAdyn off and back on	•	•
560	V > VZ	<b>Cause:</b> When travelling at a controlled speed V_Z (resetting), the speed was 10% higher than the specified setpoint speed <b>Remedy:</b> Check the parameters set in the "Motor name plate" menu Check the "SPD_KP" and "SPD_TI" parameters in the "Controller" menu  Only active when entered in negative error screen.	•	•
565	Movement detected	<b>Cause:</b> The motor shaft moved during encoder adjustment with closed brake <b>Remedy:</b> Check whether the brake was disconnected before starting encoder adjustment. The brake must not be opened during adjustment	•	
570	PFU Alarm	<b>Cause:</b> The monitoring contact for the power recuperation unit (input "BC") opens during operation of the ZAdyn or is not closed during start-up <b>Remedy:</b> Check the power recuperation unit error display. Check the connection of the alarm relay for the power recuperation unit	•	•
575	MOT: Temp. -Alarm	<b>Cause:</b> The motor temperature has exceeded the permissible limit value during travel <b>Remedy:</b> Check the parameters set in the "Motor name plate" menu In the "Mot" info menu, check the motor current for constant travel (empty cabin down). The displayed motor current should not exceed the nominal current of the motor. In asynchronous motors, if necessary perform automatic identification of the motor parameters (in the "Motor name plate" menu, "ASM_ID" parameter) Check the duty cycle of the motor (display in info menu "Power1", value "ED") In synchronous motors, check the rotary encoder offset Check the brake lifting  Only active when entered in negative error screen.	•	•
582	BR:T2 too small	See error 346 "BR: T2 too small".		
583	BR: Fault Travel	<b>Cause:</b> Brake monitoring has tripped during travel <b>Remedy:</b> Check correct function of the monitoring contacts Check brake actuation check the power supply of the brakes  Only active when entered in negative error screen.	•	
584	BR: Fault Travel	<b>Cause:</b> Brake monitoring has tripped during travel a) For a brief interruption, entry at the end of travel b) For interruption longer than 500 ms, interruption of the travel <b>Remedy:</b> Check correct function of the monitoring contacts Check brake actuation check the power supply of the brakes	•	•
585	BR: T5 too small	<b>Cause:</b> The brake has not closed within the time "T_5" configured in the "Stop" menu <b>Remedy:</b> Check the brake triggering Check the dropout time of the brake magnet Check the setting for the "T_5" parameter and increase if necessary Check the switching function of the brake monitoring	•	•

Error no.	Error text	Error cause	M	S
587	BR: Delta t too small	<b>Cause:</b> Brakes do not engage with a time offset of min. 50 ms on emergency stop <b>Remedy:</b> Carry out brake control according to drive instructions Install free-running diode in a brake circuit Check existing free-running diode for faults	•	•
590	RV1/RV2:Change	<b>Cause:</b> The direction specification has been changed during travel <b>Remedy:</b> Check control of travel directions For sporadic occurrence: Check EMC-compatible installation (screening, etc.)  Only active when entered in negative error screen.	•	•
599	Fan defective [Lüfter defekt]	<b>Cause:</b> The feedback signal for the main fan is no longer detected <b>Remedy:</b> Check the voltage supply (terminal L/N) for the fan Remove any blockages in the impeller Switch the ZAdyn off and on again (incl. voltage reset at terminal L/N) Contact ZIEHL-ABEGG Customer Service		•

#### 15.6.10 Error 7xx - 8xx

- Trip abort due to errors between ZAdyn4Bplus and control system
- Errors which can occur in operation with CANopen Lift

If an error occurs during operation with CANopen, the frequency inverter runs through status "ST\_Delay" and finally goes to status "Check ST release". The frequency inverter remains in this status until the control sends the command "Fault Reset".

Error no.	Error text	Error cause	M	S
710	DCP: Timeout	<b>Cause:</b> DCP communication was interrupted during travel <b>Remedy:</b> Check the wiring of the DCP connection		•
715	DCP:G0-G7 missing	<b>Cause:</b> DCP telegram for setting the speed (G0-G7) is not sent by the control <b>Remedy:</b> Check compatibility of the control with the DCP specification	•	•
720	Extended in delay	<b>Cause:</b> During deceleration, the transferred remaining distance (DCP04) has been increased or a new target position (CAN) has been specified <b>Remedy:</b> Check the absolute encoder for determination of the remaining distance Check compatibility of the control with the DCP specification In the Bus Info 3 info menu, check the ratio of the distance measurement on the absolute encoder (shaft) to the motor encoder (line 4)	•	•
721	DCP:Remaining distance error"	<b>Cause:</b> The remaining distance specification does not change during travel <b>Remedy:</b> Check compatibility of the control with the DCP specification Check the absolute encoder for determination of the remaining distance	•	•
780	Quickstart > 20s	<b>Cause:</b> At the start of travel with the quickstart function, the travelling speed "V=0" is actuated for longer than 20s <b>Remedy:</b> Shorten the time in which "V=0" is triggered	•	•
781	Quick. during travel	<b>Cause:</b> The signal at the digital input configured for "V=0" is activated during travel <b>Remedy:</b> Check the triggering of "V=0"	•	•
799	RF: Interruption	<b>Cause:</b> The signal at the digital input configured for the "RF" controller enable function has been switched off during travel <b>Remedy:</b> Check the triggering of "RF" Check the safety circuit  Only active when entered in negative error screen.	•	
800	CAN: Timeout	<b>Cause:</b> Error in Velocity mode: Heartbeat from the control missing or not received at the set intervals Error in the Position mode: Heartbeat from the control and/or rotary encoder missing or is not received at the set intervals <b>Remedy:</b> Check CAN connections Check that the heartbeat for the corresponding devices is set correctly		•

Error no.	Error text	Error cause	M	S
820	CAN: Illegal State	<b>Cause:</b> The control is sending CAN control words at an impermissible time or in the wrong sequence <b>Remedy:</b> Check that the control has the latest software version	•	•
821	CAN: Position Error	<b>Cause:</b> During travel at a speed greater than 10 cm/s the shaft position does not change within 200 ms (CAN Position mode) <b>Remedy:</b> Check the CAN absolute encoder in the shaft Check the traction conditions of the drive (traction sheave)  If the error occurs 5 times in a row, the ZAdyn is locked. The lock can be released by parameter <b>Monitoring/UNLOCK=ON</b> .	•	•
831	CAN:Timeout Dis. Op.	<b>Cause:</b> The control does not issue the "Disable Operation" command within the time "T_CMD" entered in the "CAN" menu when stopping <b>Remedy:</b> Check the time for "T_CMD" Check compatibility of the control with the CAN specification CiA-417 Check the fault counter for changes during travel in the "Bus Info 4" info menu For sporadic occurrence: Check EMC-compatible installation (screening, etc.), termination of CAN bus (terminating resistors)		•
832	CAN:Timeout Shutdown	<b>Cause:</b> The control does not issue the "Shutdown" command within the time "T_CMD" entered in the "CAN" menu when stopping <b>Remedy:</b> Check the time for "T_CMD" Check compatibility of the control with the CAN specification CiA-417 Check the fault counter for changes during travel in the "Bus Info 4" info menu For sporadic occurrence: Check EMC-compatible installation (screening, etc.), termination of CAN bus (terminating resistors)		•
833	CAN:Timeout Dis.Vol.	<b>Cause:</b> The control does not issue the "Disable Voltage" command within the time "T_CMD" entered in the "CAN" menu when stopping <b>Remedy:</b> Check the time for "T_CMD" Check compatibility of the control with the CAN specification CiA-417 Check the fault counter for changes during travel in the "Bus Info 4" info menu For sporadic occurrence: Check EMC-compatible installation (screening, etc.), termination of CAN bus (terminating resistors)		•
840	CAN:Enc.Info missing	<b>Cause:</b> The "Position conversion" object (0x641F) has not been written to the frequency converter by the control <b>Remedy:</b> Check that the control has the latest software version		•

#### 15.6.11 Error 9xx

- Fatal error, which can only be acknowledged by switching off the ZAdyn4Bplus

Error no.	Error text	Error cause	M	S
903	SIO not synchr	<b>Cause:</b> When the frequency converter is switched on, internal communication between the processors is faulty, the device performs a reset and restarts <b>Remedy:</b> Update the ZAdyn software For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service	•	•
905	MOP:HW-SW Error	<b>Cause:</b> Hardware or software error occurred after switch-on. The frequency converter switches to the "Wait-Switch off" state after 60s and must be switched off <b>Remedy:</b> Switch the ZAdyn off and back on for persistent occurrence: Please contact ZIEHL-ABEGG Customer Service	•	•
906	ZR: ERR by start	<b>Cause:</b> If the "BC-TYP" parameter in the "Encoder & BC" menu is set to "ZAreC", "PFU", or "PFU+BRxx": There is no signal at the "BC" input when the ZAdyn is switched on <b>Remedy:</b> Check wiring Use the energetic recovery system display to check whether it has an error Check the setting of the "BC-TYP" parameter Switch the ZAdyn off and back on	•	•

Error no.	Error text	Error cause	M	S
907	PFU: BR alarm	<b>Cause:</b> At the digital input programmed with the "PFU_BR" function, in the 2nd parameter set the signal for temperature monitoring of the brake resistor drops out during travel <b>Remedy:</b> Check the brake resistor for overheating Check the wiring of the thermal contact on the BR Switch the ZAdyn off and back on		•
908	PFU: ERR at start	<b>Cause:</b> When switching on the frequency inverter, the monitoring contact for the power recuperation unit is not closed <b>Remedy:</b> Check the power recuperation unit for fault-free operation Check field of rotation of the mains connection for the power feedback unit Check the power recuperation unit function monitoring connection at the digital input "BC" Switch the ZAdyn off and back on		•
909	PFU Alarm	See error 570 "PFU: Alarm".		
910	BC/BR: ERR at start	<b>Cause:</b> When switching on the frequency inverter, the monitoring contact for the brake chopper or brake resistor is not closed <b>Remedy:</b> Check the connection and function of the temperature monitoring for the brake chopper or brake resistor Make sure that a voltage of 24VDC is applied at the X-IN connection terminal between +24V_IN and GND_IN (see "Brake resistor" and "Digital inputs (X-IN)" chapters in the manual) Check the "BR_TYP" parameter in the "Encoder & BC" menu Switch the ZAdyn off and back on		
911	BRxx: Overload	<b>Cause:</b> The braking performance of the brake resistor reaches 200 % of the set power within the last 120s; the travel is aborted <b>Remedy:</b> Check the "BR_TYP" parameter in the "Encoder & BC" menu When selecting the "BRxx" setting, check the set power in the "P_BR" parameter Check the brake resistor design Switch the ZAdyn off and back on	•	
912	BC:Alarm/fault	<b>Cause:</b> The monitoring contact for the brake chopper or brake resistor opens during travel <b>Remedy:</b> Check the connection and function of the temperature monitoring Check the brake resistor design Switch the ZAdyn off and back on		
913	DC: U_DC>U_BC	<b>Cause:</b> When stopped, the internal measured voltage at the DC-link is higher than the engagement voltage of the brake chopper <b>Remedy:</b> Compare the displayed value "U_DC" in the "Brake Chopper" info menu with the measured value at the DC+ and DC- terminals (measuring range 1000 VDC, ATTENTION: High voltage). If the voltage displayed deviates by more than 5%, there is a defect in the device. If the measured voltage is greater than 620V, the line voltage is not compliant with the standards Check the supply voltage between the supply phases, max. value = 440 VAC The synchronous motor is moved away when stopped Switch the ZAdyn off and back on	•	•
914	Rotary encoder missing	<b>Cause:</b> No rotary encoder is detected when the ZAdyn is switched on <b>Remedy:</b> Check the rotary encoder connection Check the "ENC_TYP" parameter in the "Encoder & BC" menu for further information, see the "Rotary encoder" info menu Switch the ZAdyn off and back on		
915		<b>Cause:</b> No rotary encoder is detected at XENC-15 when switching on the frequency inverter <b>Remedy:</b> Check rotary encoder connection Reset frequency inverter	•	


Error no.	Error text	Error cause	M	S
917	BRxx activ	<b>Cause:</b> The internal transistor for the brake resistor is still activated 5.5 s after the end of travel <b>Remedy:</b> Compare the displayed value "U_DC" in the "Brake Chopper" info menu with the measured value at the DC+ and DC- terminals (measuring range 1000 VDC, ATTENTION: High voltage). If the voltage displayed deviates by more than 5%, there is a defect in the device. If the measured voltage is greater than 620V, the line voltage is not compliant with the standards Check the supply voltage between the supply phases, max. value = 440 VAC - Synchronous motor is moved away when stopped Switch the ZAdyn off and back on		•
919	ZR: BC error	<b>Cause:</b> ZArc error message - No signal at the digital input "BC" <b>Remedy:</b> Use the ZArc display to check for an error on the ZArc Switch the ZAdyn off and back on		•
920	Overcurrent standstill.	<b>Cause:</b> Overcurrent at standstill <b>Remedy:</b> Check the wiring of the brake chopper (if fitted) Check EMC-compatible installation (screening, etc.) For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		
931	Internal error	<b>Cause:</b> Internal device error <b>Remedy:</b> Switch the ZAdyn off and back on For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
935	MP: PWM on	<b>Cause:</b> Internal device error <b>Remedy:</b> For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
950	TD_CNT: Limit	<b>Cause:</b> The maximum number of changes of direction has been reached <b>Remedy:</b> Replace the suspension means and reset the counter One journey is possible after switching the ZAdyn off and back on		•
960	STO: Diagnostic	<b>Cause:</b> The status of the STO_A and STO_B signals was different for longer than 310 ms. The ZAdyn is the locked by internal hardware diagnostics <b>Remedy:</b> Check actuation of the STO inputs Error can only be reset once the ZAdyn4Bplus is switched off		•
961	STO: Hardware	<b>Cause:</b> Hardware error in the STO diagnostics <b>Remedy:</b> Please contact ZIEHL-ABEGG Customer Service	•	•
962	STO: HW standstill [STO: HW Stillstand]	<b>Cause:</b> The internal diagnostic unit has detected an incorrect signal state. <b>Remedy:</b> Switch the ZAdyn off and back on Contact ZIEHL-ABEGG Customer Service		•
963	STO: Hardware start	<b>Cause:</b> The internal diagnostic unit has detected an incorrect signal state. <b>Adjustment:</b> Switch the ZAdyn off and back on Contact ZIEHL-ABEGG Customer Service		•
964	STO: Hardware stop	<b>Cause:</b> The internal diagnostic unit has detected an incorrect signal state. <b>Adjustment:</b> Switch the ZAdyn off and back on Contact ZIEHL-ABEGG Customer Service		•
970	DC: U < UDC_MIN	<b>Cause:</b> The DC-link voltage has fallen below the limit value for the minimum voltage during travel <b>Remedy:</b> There is a power failure during travel, check the voltage of the 3 phases of the power supply Check the "UDC_MIN" parameter in the "Power unit" menu (factory setting: 450 V) Check the mains connection (line voltage, cable cross-section, line reactor design, mains impedance)		•
972	Failure of a phase	<b>Cause:</b> A phase failure occurs during motorised travel and a reset is triggered. No error is generated during regenerative travel <b>Remedy:</b> Check the 3 phases of the supply voltage (measure L1, L2, L3 to PE)		•

Error no.	Error text	Error cause	M	S
975	DC: U > 850V	<b>Cause:</b> The DC-link voltage rises to more than 850 VDC during travel or when stopped <b>Remedy:</b> Check the "A_NEG" parameter in the "Deceleration" menu and reduce if necessary Check the connection and function of the brake chopper / brake resistor In the "Encoder & BC" menu, check the "BC_TYP" parameter Compare the displayed value "U_DC" in the "Brake Chopper" info menu with the measured value at the DC+ and DC- terminals (measuring range 1000 VDC, ATTENTION: High voltage). If the voltage displayed varies by more than 5%, there is a defect on the device. If the measured voltage is higher than 620 V, the line voltage is not compliance with the standards Switch the ZAdyn off and back on Check the size of the Brake-Chopper / Brake-Resistor,		•
976	STO: Temp. alarm	<b>Cause:</b> The temperature in the area of the STO safety circuit exceeds 75 degrees Celsius <b>Remedy:</b> Check the function of the unit fans Ensure an ambient temperature of less than 55 degrees Celsius Switch the ZAdyn off and back on		•
980	SW error (zm)	<b>Cause:</b> Internal error, unknown state <b>Remedy:</b> Switch the ZAdyn off and back on Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
981	SW error (zm cc)	<b>Cause:</b> Internal error, unknown travel curve computer state <b>Remedy:</b> The error can only be reset by switching off the ZAdyn Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
982	SW error (T>4.5ms)	<b>Cause:</b> Internal device error, maximum cycle time for internal calculations almost reached <b>Remedy:</b> Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
990	SW error (Stacktop)	<b>Cause:</b> Internal ZAdyn error <b>Remedy:</b> Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
991	SIO: Timeout	<b>Cause:</b> Communication between the motor management processor (MOP) and the application processor (APP) interrupted <b>Remedy:</b> Check EMC-compatible installation (screening, etc.) For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•
994	MOP: Timeout 2	<b>Cause:</b> Communication between the motor management processor (MOP) and the application processor (APP) is interrupted when stopped <b>Remedy:</b> For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service For sporadic occurrence: Check EMC-compatible installation (screening, etc.)		•
997	SW error (MOP)	<b>Cause:</b> <b>Cause:</b> Internal motor management processor (MOP) error <b>Remedy:</b> Perform a software update For persistent occurrence: Please contact ZIEHL-ABEGG Customer Service		•

### 15.6.12 Information texts

An information text appears in the display for approx. 2 s for faults which are not saved in the fault list.

Information text	Cause
CO-Interrupt	During a non distance-dependent travel (speeds V4 ... V7) the travel contactors are opened. During the stopping process motor contactors are opened, before the timer T_5b has expired. The number of CO interruptions is counted in the <b>Statistic/SCO</b> menu.
RF-Interrupt	The controller enable (signal CE) is deactivated during travel. During the stopping process the controller enable (signal CE) is deactivated before the timer T_5b has expired. The number of CE interruptions is counted in the <b>Statistic/SCE</b> menu.


Information text	Cause
s1 = 0 cm	During the distance-dependent delay phase from travelling speed V2 or V3 to positioning speed V1 the signal is already deactivated for the positioning speed V1.
Attention! $n^* > n$	Calculated speed $n^*$ is greater than the speed $n$ specified on the nameplate.
automatic pre-signment?	After changing the parameter $V^*$ , you can confirm the request "automatic pre-signment?" with yes or no.
Change suspension means! [Wechsel Tragmittel!] Remaining change in direction of travel: xxx	The suspension means used must be replaced within approx. 1 year at the latest. The remaining number of changes of direction with the current suspension means is displayed and continuously refreshed. The calculation is based on evaluation of system utilisation in the past. Any change in the utilisation after the information is output is not taken into account. The text must be confirmed with the  key, otherwise the message will remain in the display.

### 15.7 Operation conditions of the ZAdyn4Bplus

The software of the ZAdyn4Bplus divides the travel curve into multiple ranges. Each of these ranges is allocated a status number, which relates to a certain operating state.

If an error occurs, the status number is stored with the error number in the error list.

Furthermore, the operating statuses are displayed with the status number and in plain text in the **Info/Page02** menu.

status	Condition of the frequency inverter	status	Condition of the frequency inverter
10	Checking of voltage supply	420, 430	Constant running at speed $V_x$
21	Check software version	440, 480	Deceleration to speed 0m/s
22	Parameter transmission	460	Deceleration to speed $V_x$
23	Waiting for signal processor, power unit detection	490	Emergency stop: Deceleration at max. acceleration
30	Check absolute value encoder	493	Mode with travel curve computer switched off
35	Evacuation monitor	495	Travel curve computer end
40	Activation of DC-link voltage	500	Keep motor at speed 0 (T4)
41 42	Check input BC 41: Power feedback unit 42: Brake chopper or brake resistor	510	Wait until the motor brakes are closed (T_5)
50,55	Adjust current transformer	515	Brake is energised for 1 s longer
70	Check temperature power unit	520	 Switch off current supply to motor (T_5b)
80	Start fan	530	Wait until motor contactors switched off
90	Electronic short-circuit active	535	Travel interrupted due to interruption of the controller enable RF
91	Electronic short-circuit deactivated	536	Travel interrupted due to interruption of the contactor monitor COx
93	Standby 1	538	Wait until STO activates
96	Parameter calculation active	540	Wait for standstill
97	Editing parameter	560	End of travel
98	Waiting for ZArc	570, 572, 575, 902, 904	Recording to MMC
99	Waiting for rotary encoder	900	Delay of automatic acknowledgement after remedying the cause of the fault (2 s)
100	Device off	907	Checking for overcurrent
105	Power feedback unit on standby	908	Deceleration after overcurrent
107, 108	Modifying the clock frequency	909	Waiting for travel command off
110	Machine ready	910	ZAdyn locked
115	Start delay	920	Read absolute value error
200	Start-up check	930	Power unit overtemperature
210 ... 223	Check absolute value encoder	932	Motor overtemperature

status	Condition of the frequency inverter	status	Condition of the frequency inverter
280	Wait until STO deactivates	940, 942	Read hardware error
300	Wait until motor contactors switched on	950	Parameter change
305	Checking the motor phases	960	Read absolute value error
310	<a href="#">A</a>	980	Switch off DC-link
311	Build-up of magnetic field in the motor (T1)		
315, 316	Checking absolute value	982	Motor type changed
319	Start control	988	Wait for reset
320	Wait until motor brakes have opened (T2)	990	Fault input BC
325	Quickstart	993	Overcurrent at standstill
330	Accelerate motor to speed V_T3 (T3)	995	Maximum change of direction reached
340	Commissioning	996	STO error
400	Travel curve computer data transmission	997	Frequency converter is in stand-by mode
410	Accelerate to speed Vx	998	Wait until ZAdyn4Bplus is switched off

### 15.8 Frequent startup problems


Problem	Cause	Remedial measures
ZAdyn4Bplus does not start after switching on	Brake resistance is connected to the +DC and -DC terminals on terminal X1/X3	Brake resistance is connected to the +DC and R terminals on terminal X1/X3
ZAdyn4Bplus stops in status 40 during the start procedure, the error message relay of output O11-O14 does not pick up, the menu can be operated	Input voltage is too low	Check the frequency inverter input voltage
	One phase on the line connection is missing	Check wiring of the line connection
Motor does not reach nominal speed (comparison of actual and nominal speed visible in the Info menu on page 04)	Half load adjustment is not correct	Check half load adjustment and correct if necessary
	Settings in the "Motor Rating Plate" and "System Data" menus are not correct	Check settings in the "Motor Rating Plate" and "System Data" menus (the value of the "n*" parameter in the "System Data" menu may not be much greater than the value of the "n" parameter in the "Motor Rating Plate" menu)
	Motor data are not correct	

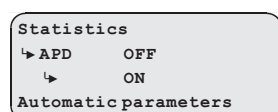
### 15.9 Automatic parameter diagnostics (APD)

During Automatic parameter diagnostics, the following are checked:

- The parameters for plausibility and tolerances
- Device functions for functional errors

Erroneous parameters or functions are shown in the display.

Every message must be acknowledged by the user with the  key. The APD function can be activated in the **"Statistic/APD"** menu. After checking, the function is reset to "OFF".





## 16 Energy saving

### 16.1 ZAdyn4Bplus standby function

To save energy at standstill, the ZAdyn4Bplus can be switched to stand-by mode. Internal components of the ZAdyn4Bplus are switched off in stand-by mode. This means that the ZAdyn4Bplus has a much lower power loss at standstill. There are two stand-by modes in the ZAdyn4Bplus: Standby 1 and Standby 2

#### Standby 1:

**In Standby 1 mode, the rotary encoder, monitoring functions and the output relay remain active,**

#### Standby 2:

**In Standby 2 mode, the rotary encoder is switched off, the monitoring functions are not active and all relays are switched off, including the fault indication relay.**

#### 16.1.1 Activate Standby 1 or Standby 2 mode



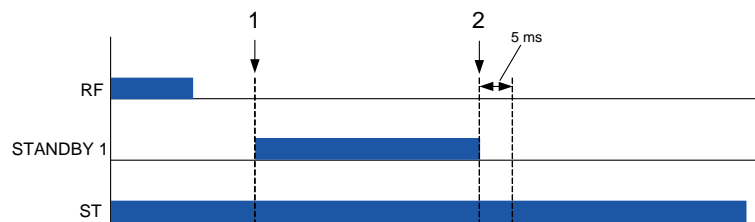
#### Information

It is only possible to switch to Standby 1 or Standby 2 mode when the controller enable (input RF) is switched off.

Set digital input in the **Control system** menu to **STANDBY1** or **STANDBY2**.

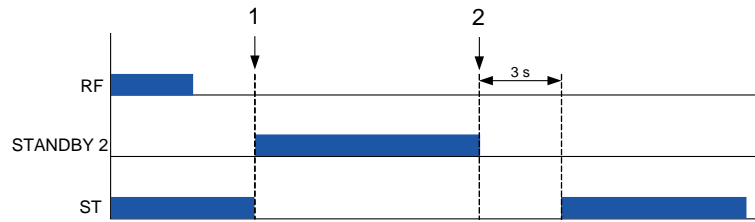
```
Brake Control
└─ f_I08 STANDBY1
  └─ STANDBY1
Function I08
```

5 ms after deactivation of the digital STANDBY1 input, the ZAdyn4Bplus is ready for operation again (see diagram).



Function of Standby 1 mode for ZAdyn4Bplus  
 1 STANDBY1 input is activated  
 2 STANDBY1 input is deactivated  
 RF Controller enable  
 STANDBY1 Input with STANDBY 1 function  
 ST Fault

3 after deactivation of the digital STANDBY2 input, the ZAdyn4Bplus is ready for operation again. The ST fault output is activated (see diagram).



Function of Standby 2 mode for ZAdyn4Bplus  
 1 STANDBY2 input is activated  
 2 STANDBY2 input is activated  
 RF Controller enable  
 STANDBY2 Input with STANDBY 2 function  
 ST Fault

## 16.2 Power Feedback Unit (PFU)

The power feedback unit offers the possibility to save energy by feeding the energy generated in a generator run into the supply network. This energy is used by other consumers in the building.



### Information

By using a power feedback unit graduation in energy efficiency class A according to VDI 4707 can be achieved!

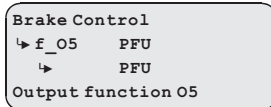
### 16.2.1 Stand-by operation of the power feedback unit

To reduce the power loss of the power feedback unit at standstill the REVCON power feedback unit can be switched to stand-by mode.

		Revcon		
		RLD-BO 33 - 400	RLD-BO 45 - 400	RLD-BO 70 - 400
Power losses during standstill	[W]	24		
Power loss in standby	[W]	8		

#### 16.2.1.1 Activation of stand-by mode

Set digital output (preferably f\_05) in the **Control system** menu to the **PFU** function.

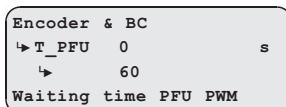


To switch the power feedback unit to stand-by mode the input A2 of the power feedback unit must be disconnected from GND!

Deactivation of the digital output PFU:

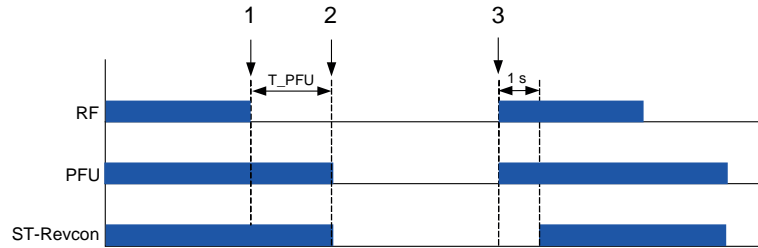
- Power feedback unit switches to standby mode

The time between the end of travel and activation of the PFU output can be specified with the **Encoder & BC/T\_PFU** parameter.



If the parameter **T\_PFU** is set to **0s**, the output PFU is always active. Standby is now deactivated.

1 s after deactivation of the digital output PFU the power feedback unit is ready for operation again (see diagram).



Function stand-by mode Revcon

- 1 End of travel
- 2 Output with the "PFU" function is deactivated
- 3 Output with the "PFU" function is activated

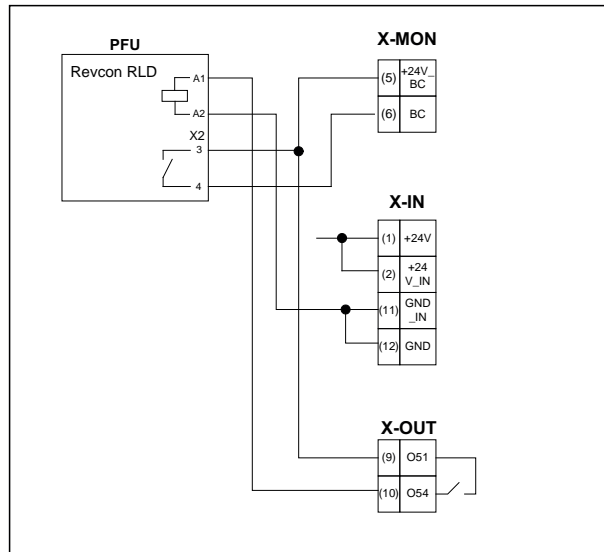
RF Controller enable

PFU Output with the "PFU" function

ST-Revcon Output "Fault" of the power feedback unit

**16** Energy saving

### 16.2.1.2 Electrical connection stand-by mode



Connection Revcon power feedback unit with stand-by mode

### 16.2.1.3 Power feedback unit in connection with automatic emergency evacuation.

**CAUTION!**

In lift systems with automatic emergency evacuation by a three-phase mains supply (emergency power supply unit/UPS), the power feedback unit is not active due to the operating voltage failure. To avoid too high a voltage in the intermediate circuit when evacuating by a generator run, a brake resistor must be used in addition to the power feedback unit!

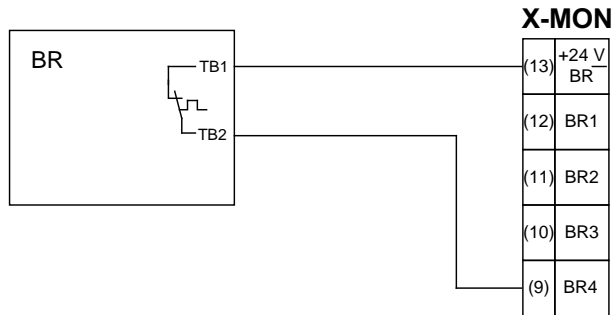
The combination power feedback unit + brake resistor must be entered in the **Encoder & BC/BC\_Typ** menu

```
Encoder & BC
↳ BC_TYPE PFU+BR17
  ↳ PFU+BR25
BR/BC - Type
```

### Connection and parameterisation temperature monitor brake resistance

The temperature monitor is connected to a digital input (X-IN or X-BR). The input must be parameterised to the **PFU\_BR** function.

```
Brake Control  
↳ f_XBR4 PFU_BR  
↳ PFU_BR  
Function input BR4
```




Connection brake resistor

## 17 Special functions

### 17.1 Changing the switching frequency

The factory setting for the switching frequency of the ZAdyn4Bplus is 8 kHz.

If necessary, the switching frequency can be changed in the **Power Unit** menu continuously between 3.7 and 8 kHz. For release the ESC key  must be pressed for approx. 5 s until **ZIEHL-ABEGG-Internal RELEASE** appears in the display.



#### Information

The switching frequency should only be changed after consulting the ZIEHL-ABEGG hotline. This consultation can clarify what effect changing the switching frequency will have on the service life of the ZAdyn4Bplus.

CAUTION!

#### Caution!

Increasing the switching frequency causes

- A performance reduction of the ZAdyn4Bplus (see Technical Data chapter)
- A greater power loss and thus increased heating of the ZAdyn4Bplus

The service life of the ZAdyn4Bplus is negatively influenced by the higher temperatures.

#### 17.1.1 Fixed presetting of the switching frequency (Menu Power section/M\_PWM=Fix f\_PWM)

The switching frequency of the ZAdyn4Bplus is 3.7 kHz after factory setting. This can be changed, if necessary, in the **Power Unit/f\_PWM** menu continuously between 3.7 and 8 kHz.

#### 17.1.2 Automatic adjustment of the switching frequency (Menu Power section/M\_PWM=Auto)

The frequency inverter works with the switching frequency configured in the **Power component/f\_PWM\_H** menu.

If required, the frequency inverter switches to the switching frequency configured in the **Power component/f\_PWM** menu.

### 17.2 Calibration of absolute rotary encoders

CAUTION!

#### Caution!



Rotary encoder calibration must be performed when a synchronous motor is in operation. Operating the motor without rotary encoder calibration can cause uncontrolled motor movements!

Traveling is prohibited before an absolute encoder offset alignment has been performed!



#### Information

In Ziehl-Abegg motors, the absolute encoder is already aligned in the factory to the offset value "0".

**It is no longer necessary to perform an absolute encoder offset alignment!**

#### Options for calibrating an absolute encoder

The ZAdyn4Bplus has two different methods for calibrating the absolute value encoder:

- **load-free** calibration of the absolute value encoder
- calibration of the absolute value encoder with **brake closed**

#### General conditions required for an encoder alignment without load:

- The installation and motor data must be configured
- Load-free operation, suspension means must be removed from the traction sheave
- Brake monitoring must be activated corresponding to the number and type of brakes in use (**Monitoring/BR** menu)
- Contactor monitoring must be configured according to the type of contact for monitoring (**Monitoring/CO** menu)

**General conditions required for an encoder alignment closed brake:**

- The installation and motor data must be configured
- It must be ensured that the brake does not open during the calibration (disconnect brake)
- Brake monitoring must be activated corresponding to the number and type of brakes in use (**Monitoring/BR** menu)
- Contactor monitoring must be configured according to the type of contact for monitoring (**Monitoring/CO** menu)

**17.2.1 Load-free alignment SSI-Encoder**

While the SSI encoder is being calibrated, the ZAdyn4Bplus energises the motor with direct current. In the process, the rotor jumps to the centre of the nearest magnetic pole. In this rotor position, the SSI encoder must be manually calibrated to its zero point. In order to make assembly easier, it is recommended that you connect the SSI encoder to the ZAdyn4Bplus prior to assembly and calibrate the offset value "0" (value in the **ENCODER calibration/ENC\_POS**). Subsequently mount the SSI encoder, if possible without any twisting, in the position in which the locking screw is easily accessible.


```
MMC recorder
-> Encoder-adjust.
Safety gear
HW-Ident.
```

Select menu **Encoder adjustment**



```
Encoder adjust.
↳ ENC_ADJ OFF
  ↳ No load
Encoder Position
```

Select parameter **"ENC\_ADJ"**  
 Switch on encoder adjustment with "ENC\_ADJ=No load".

```
Are you sure?
[No] [Yes]
```

Confirm with the  key.

```
Brakes will be opened
without any torque!
Is the motor load-free?
[Esc] [Yes]
```

Query as to whether the drive is in a load-free condition.  
 Press the  key to cancel rotary encoder adjustment.  
 Press the  key to continue rotary encoder adjustment.

```
Inspection starting
Encoder adjust.!
```

[Esc]

Keep the inspection run push-button pressed.  
 Performing rotary encoder adjustment.

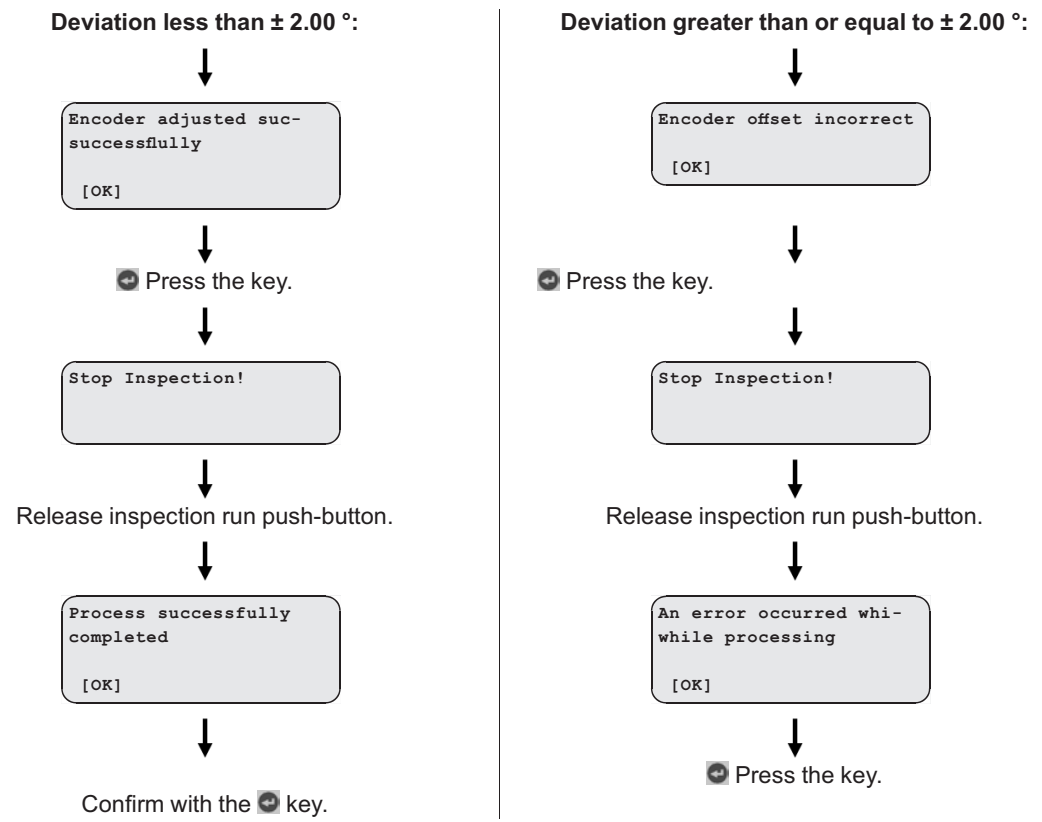
```
Set offset to zero me-
chanically
30°
[Esc] [Done]
```

Adjust the rotary encoder as precisely as possible to the value **0 °** and carefully fasten the clamping screw, correcting the encoder position if necessary. At the end of the adjustment procedure, the rotary encoder must be securely tightened and the value close to **0**. With deviations of less than  $\pm 2.00 \text{ °}$  the adjustment is classed as correct. A deviation of max.  $\pm 1 \text{ °}$  is recommended.

**Line 2:**  
 Current offset value

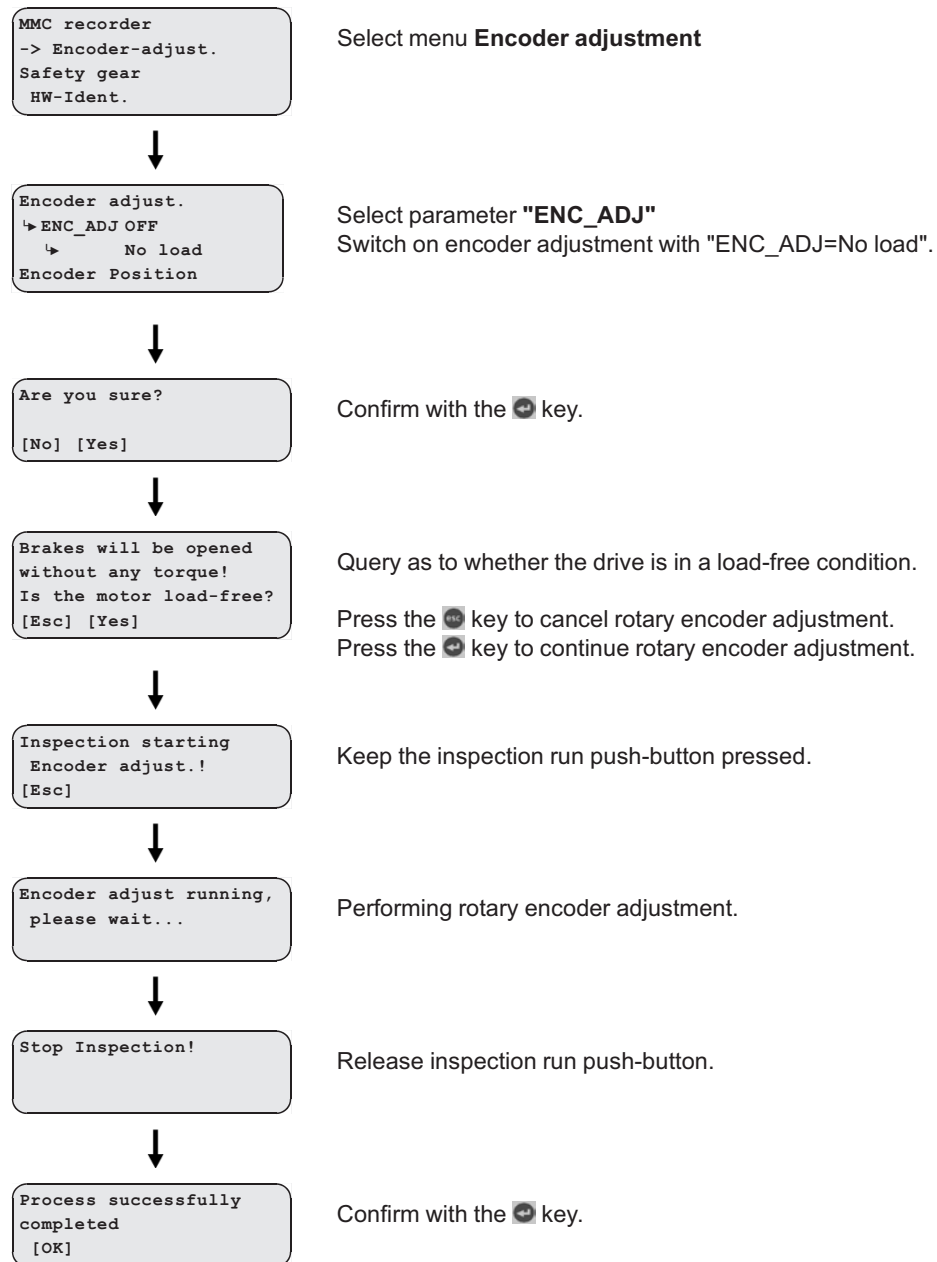
Once the rotary encoder has been adjusted, confirm with the  key.

The ZAdyn checks whether the deviation is less than  $\pm 2.00^\circ$ .



### 17.2.2 Load-free alignment EnDat-Encoder

While the EnDat encoder is being calibrated, the ZAdyn4Bplus energises the motor with direct current. In the process, the rotor jumps to the centre of the nearest pole. In this rotor position, the offset value is saved to the EnDat encoder and the EnDat encoder is subsequently set to position "0".





### 17.2.3 Checking the load-free alignment of the SSI- & EnDat-encoders

While the rotary encoder calibration is being checked, the ZAdyn4Bplus energises each individual pole of the motor with direct current. The offset is determined at each pole and the averaged offset is calculated from this. This offset can be saved in the ZAdyn4Bplus.



**Information**

The offset determined during the check is not saved in the ZAdyn4Bplus.



**Information**

During the encoder offset alignment, the traction sheave must turn to the right (when looking at the traction sheave). Once the alignment is complete, the traction sheave must be located in the same position as at the start of the process.

#### Saving the checking

To save the result, a memory card needs to be in the X-MMC card slot during the check. The result is filed under **travel number.POL** in the folder **/4CX/DEVICE/[Seriennummer]/LST**.

```
MMC recorder
-> Encoder-adjust.
  Safety Brake
  HW-Ident.
```

Select menu **Encoder adjustment**

```
Encoder adjust.
↳ ENC_ADJ OFF
  ↳ Check
  Encoder Position
```

Select parameter "**ENC\_ADJ**"  
Switch on encoder adjustment with "**ENC\_ADJ=Check**"

```
Are you sure?
[No] [Yes]
```

Confirm with the **↵** key.

```
Brakes will be opened
without any torque!
Is the motor load-free?
[Esc] [Yes]
```

Query as to whether the drive is in a load-free condition.

Press the **ESC** key to cancel the inspection.  
Press the **↵** key to continue the inspection.

```
Inspection starting
Encoder adjust.!
[Esc]
```

Keep the inspection run push-button pressed for approximately 2 minutes. The offset value check now runs automatically and lasts about 2 minutes.

```
Running, active pole
5
```

The rotor now makes a full revolution and the offset value is determined at every pole.

```
Stop Inspection!
```

Release inspection run push-button.

```
Encoder check finished
359°
[OK]
```

**17.2.4 Rotary encoder calibration with closed brake**

If the rotary encoder is calibrated with the brake closed, it is not necessary to remove the suspension means from the traction sheave. This allows calibration to be performed with much less effort.

CAUTION!

**Caution!**

The electric brake of the motor must not open during the encoder offset alignment!  
 It is recommended to remove the electrical connection of the brake for the duration of the encoder offset alignment!



**Information**

Considerable noise may occur at the motor for approx. 10-15 s during alignment. These noises are caused by the special form of energization of the motor and are normal for this kind of encoder offset alignment.

Please keep the button for the inspection travel still closed!

CAUTION!

**Caution!**

**If the device is replaced, the offset needs to be entered in the new device!**

```
MMC recorder
-> Encoder-adjust.
Safety gear
HW-Ident.
```

Select menu **Encoder adjustment**



```
Encoder adjust.
↳ ENC_ADJ OFF
  ↳ Braked
Encoder Position
```

Select parameter "**ENC\_ADJ**"  
 Switch on encoder adjustment with "ENC\_ADJ=On halt"



```
Are you sure?
[No] [Yes]
```

Confirm with the key.



```
Has the electrical
connection for the
brake been disconnecte-
isconnected? [Ist der e-
elektrische Anschluss
der Bremse abgeklemmt?]
[Esc] [Yes]
```

Query as to whether the electrical connection for the brake is disconnected.

Press the key to cancel rotary encoder adjustment.  
 Press the key to continue rotary encoder adjustment.



```
Inspection starting
Encoder alignment!
[Esc]
```

Keep the inspection run push-button pressed.

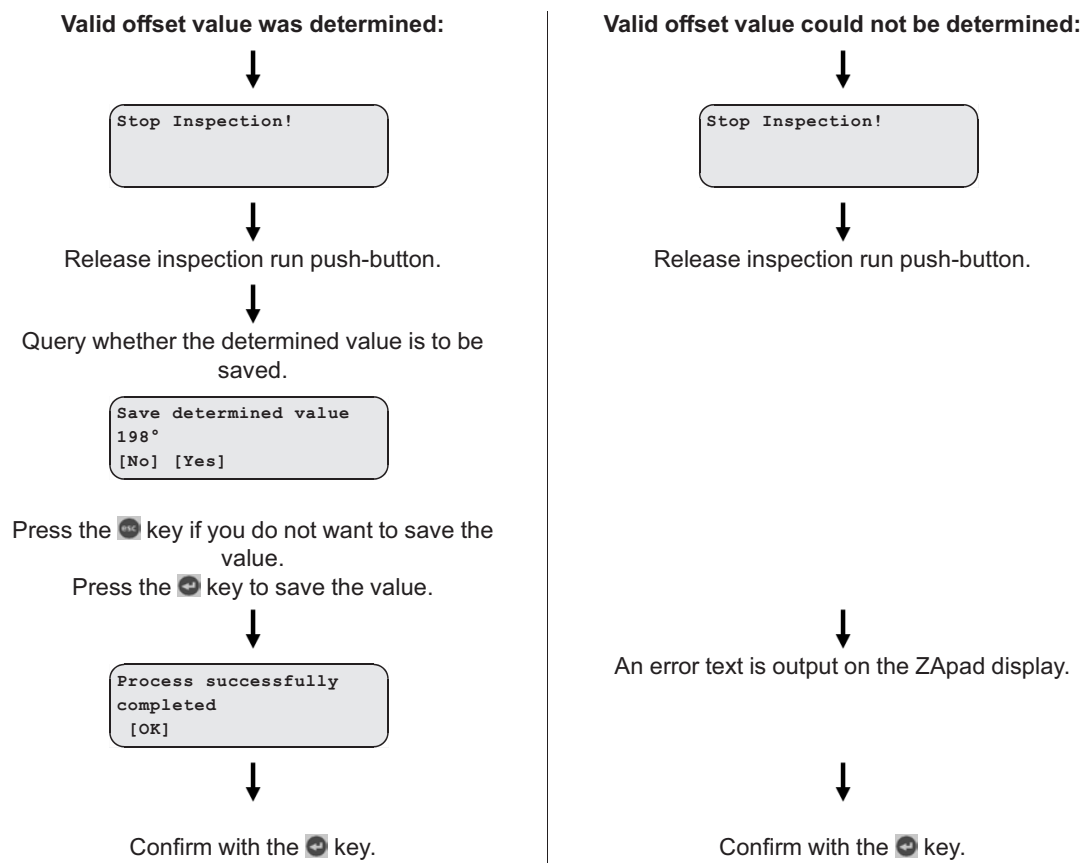


```
Encoder adjust running,
1A
```

Performing rotary encoder adjustment.

**Line 3:**  
 Current motor current

The ZAdyn checks whether a valid offset value could be determined.



**17.2.5 Alignment absolute encoder type ERN1387**

The calibration of absolute value encoders of type ERN1387 corresponds to calibration with brake closed.

**17.3 Safety Brake**

Function to release the car from the safety gear.

In this function, the motor builds up its maximum torque dependent on the configured values for the pulse sequence, thus attempting to pull the car from the safety gear.

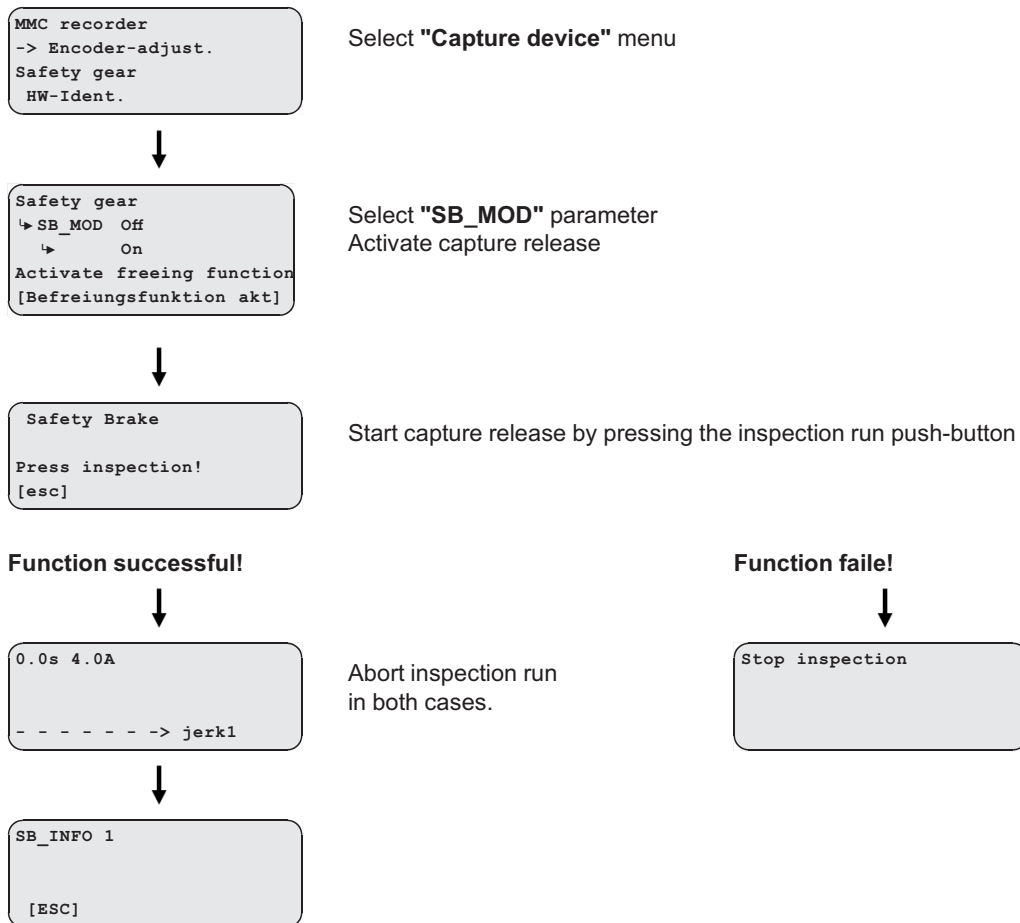
In order to provide the maximum power, the clock frequency of the pulse width modulation is reduced during the safety-brake function time.

**Caution!**

Do not repeatedly carry out the safety brake (release )function, as this can destroy the ZAdyn4Bplus.

CAUTION!

**Carrying out the safety brake-function**



**Information**

If required, the parameters impulse amplitude, impulse time, impulse pause and number of impulses can be changed in the **Safety gear** menu.

### 17.4 Reset

Allocating the parameters of the ZAdyn4Bplus with the standard values or customer-specific system data.

The works setting is made by a numeric input in the **Statistic/RESET** menu.

**Reset-functions:**

Reset-No.	Effect
77	<b>Pre-parametrised ZAdyn4Bplus:</b> Parameters are assigned customer-specific system data <b>Standard ZAdyn4Bplus:</b> Parameters are assigned default values based on the available hardware
90	deleting of: <ul style="list-style-type: none"> <li>• Parameter</li> <li>• Error list</li> <li>• Error messages</li> </ul> Parameters are assigned default values based on the available hardware
99	deleting of: <ul style="list-style-type: none"> <li>• Parameter</li> <li>• Error list</li> <li>• Error messages</li> </ul> Parameters are assigned default values based on the available hardware

CAUTION!

**Caution!**



In synchronous motors, the parameters for the encoder offset (ENC\_OFF) are set to 0 during a reset. If a value was entered beforehand for ENC\_OFF, after performing a reset either an encoder-offset alignment must be carried out or the old values for ENC\_OFF must be entered!

Operating the motor without encoder offset alignment can cause uncontrolled motor movements!

CAUTION!

**Attention! - Reset 90 and 99**

Any pre-parametrisation carried out by ZIEHL-ABEGG for the ZAdyn4Bplus will be lost if a reset is performed.

**The parameters are allocated the factory settings. These do not correspond to the pre-configuration!**



**Information**

You can only start-up again after entering the parameters in the **Motor name plate, Encoder & BC, Installation, Control system** and **Monitoring** menus (see "Commissioning" chapter).

### 17.5 Memory card

The following functions are feasible when using a memory card (MMC card or SD card) in the X-MMC card slot:

- Software-Update (see "Memory card / Software update" chapter)
- Storing parameters (see "Parameter list / Menu Memory Card / Function SAV\_PAR" chapters)
- Loading parameters (see "Parameter list / Menu Memory Card / Function LOD\_PAR" chapters)
- Storing parameter lists, error lists and parameters with allocation of the ZAdyn4Bplus serial number (see "Parameter list / Menu Memory Card / Function SAV\_ALL" chapters)
- Continuous recording of operating curves with an MMC recorder and saving the measurements in standstill (see "Parameter list / Menu MMC recorder" chapter)



**Information**

The LED of the ZAdyn4Bplus lights up in blue when the ZAdyn4Bplus is accessing the memory card.

### 17.5.1 Software update

If a software update becomes necessary, you can carry it out using a memory card (SC/MMC).

The update is available at:

- Internet ([www.ziehl-abegg.com](http://www.ziehl-abegg.com))
- Email with software from ZIEHL-ABEGG
- Memory card from ZIEHL-ABEGG written with software



#### Caution!

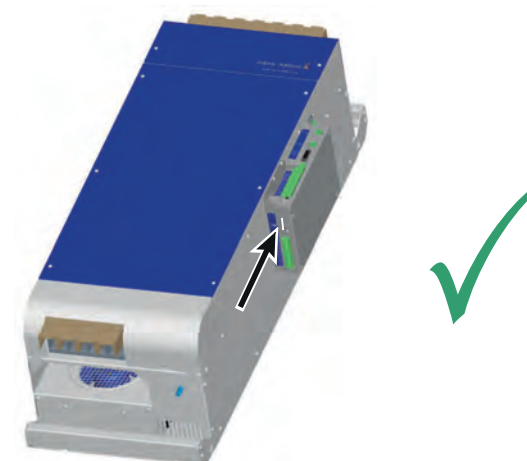
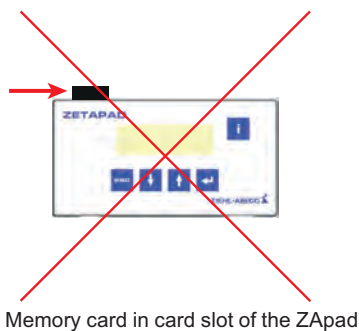
Carry out a supervised inspection trip after completing the update!

#### 17.5.1.1 Software update with the ZApad operating terminal

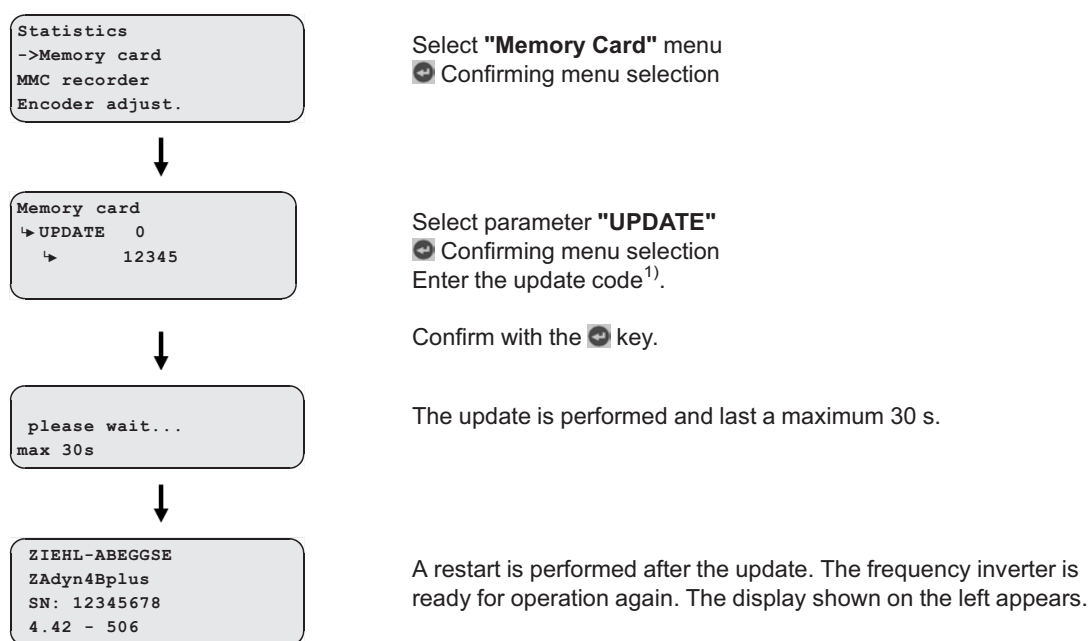
##### Perform a software update

- ▷ Insert the memory card in the X-MMC card slot on the controller unit (see figure bottom right).

**A software update cannot be made with the card slot on the ZETAPAD! Do not insert the memory card in the card slot of the ZApad!**



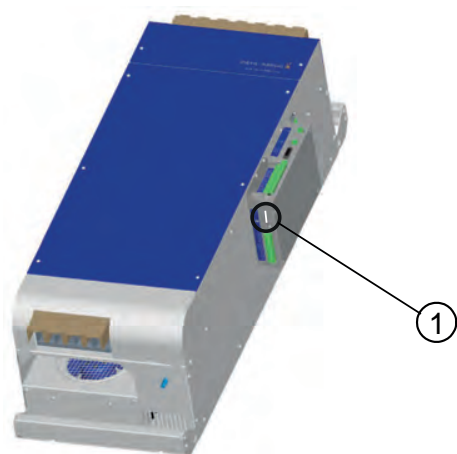
Memory card in the X-MMC card slot for ZAdyn4Bplus



<sup>1)</sup>The update code can be created depending on the ZAdyn serial number and the firmware version at the following link: <https://zacode4drives.ziehl-abegg.com/>. Alternatively, it can be created using the ZAMonMobile app.

### 17.5.1.2 Software update without ZApad control terminal

- ▷ Switch off the mains switch and wait until the controller unit is voltage free.
  - ▷ Insert the memory card with the software update into the "X-MMC" card slot (see Fig.).
  - ▷ Switch on the master switch. The inverter starts again.
  - ▷ After the LED illuminates yellow for the first time, remove the memory card and then reinsert it. You must complete this procedure within 5s (watch for fast flash code of the LED).
  - ✓ The Update starts (duration max. 30s).
- Following another automatic reset, the ZAdyn4Bplus is once more ready for operation.

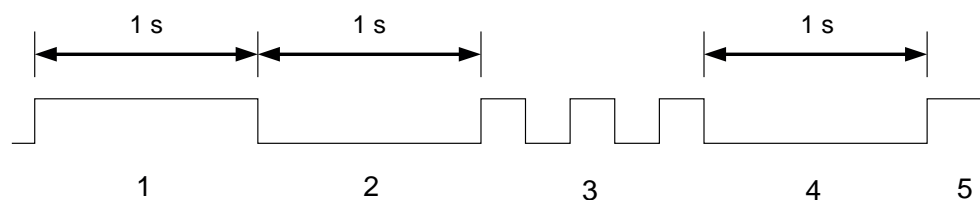


1 Location of X-MMC card slot for ZAdyn4Bplus

### 17.5.1.3 Error flash code during a software update

If an error occurs during the software update, a flash code is issued by LED for the corresponding error message.

☞ See the "Error Diagnostics / Light Emitting Diodes" chapter for the position of the LED.



- 1 white glow (1 s)
- 2 Break (1 s)
- 3 Slowly flashing (Number of pulses corresponds to the error message in the table below)
- 4 Break (1 s)
- 5 Cycle is repeated

Number of pulses	Error description
1	EEPROM is missing
2	The memory card does not contain a software update
3	The update software on the memory card is identical to the software in the frequency inverter
4	The memory card does not contain a valid software update
5	The files in the update software are identical
6	External application-processor RAM is defective
7	<b>Error:</b> Occurs if the ZAdyn4Bplus is restarted after error 25 has occurred. <b>Remedy:</b> Repeat the software update without the ZApad control terminal
8,14	Internal programming voltage does not switch off
8,19	Internal programming voltage does not switch off (it is possible that the prog. key is blocked)
16	Error while deleting the program memory (flash delete error)
17	Error while writing the program memory (Flash write error) (Flash write error)
18	Error while checking the written files in the program memory (flash data error)
23	Memory card was removed too early
25	Check sum of the update code incorrectly detected



### 17.5.2 Parameter back-up

The parameters of a frequency inverter can be saved to the memory card.



#### Information

You can only save the parameters of **one** frequency inverter to the memory card. It is not possible to save the parameters of multiple frequency inverters.

#### Parameter back-up

```
Statistics
->Memory card
MMC recorder
Encoder adjust.
```

Select "**Memory Card**" menu  
 Confirming menu selection



```
Memory card
↳ SAV_PAR OFF
  ↳ ON
```

Select "**SAV\_PAR**" parameter  
 Confirming menu selection  
 Select "SAV\_PAR=EIN"



Confirm with the key.

```
Please wait ...
Copy1: _ _ _ _ _
```

The parameters are saved.

### 17.5.3 Loading parameters

With identical systems, the saved parameters of a frequency inverter can be loaded into the frequency inverters of the other systems.

#### Loading parameters

```
Statistics
->Memory card
MMC recorder
Encoder adjust.
```

Select "**Memory Card**" menu  
 Confirming menu selection



```
Memory card
↳ LOD_PAR 0
  ↳ 27
```

Select "**LOD\_PAR**" parameter  
 Confirming menu selection  
 Enter "LOD\_PAR=27"



Confirm with the key.

```
Please wait ...
Copy1: _ _ _ _ _
```

The parameters are saved.

### 17.5.4 Saving parameters lists, printer lists and error lists

Parameter lists, printer lists and error lists can be saved on the memory card with allocation of the ZAdyn4Bplus serial number.

The following folder structure is created on the memory card: "**4CX\DEVICE\serial number**". The "LST" and "PAR" folders are created in the "Serial Number" folder. The error lists and printer lists are saved in the "LST" folder, the parameter lists are saved in the "PAR" folder. The lists are named according to the actual number of runs at the time of the data backup (e.g. "00000109.FLT" with 109 runs).

#### Loading parameters

```
Statistics
->Memory card
MMC recorder
Encoder adjust.
```

Select "**Memory Card**" menu  
➡ Confirming menu selection

```
Memory card
↳ SAV_ALL OFF
  ↳ ON
```

Select "**SAV\_ALL**" parameter  
➡ Confirming menu selection  
Select "SAV\_ALL=EIN"

Confirm with the ➡ key.

```
Copy1:
-----
```

The parameter list, the printer list and the error list are saved.

```
Memory card
-> SAV_ALL Off [SAV_AL-
[SAV_ALL Aus]
SAV_PAR Off
```

After the data backup the "SAV\_ALL" parameter reassumes the value "OFF".

### 17.5.5 Performing measurements

It is possible to perform measurements on the ZAdyn4Bplus. These measurements are configured in the **MMC-Recorder** menu and can be saved on the memory card. A description of the individual parameters of the **MMC-Recorder** menu can be found in the chapter "Parameter List / Menü MMC-Recorder". The following folder structure is created on the memory card: "**4CX\DEVICE\serial number\Rec**". A sub-folder is created in the "Rec" folder for every measuring variant. The measurements are saved in these sub-folders. The following sub-folders can be created:

- "**ERR**" folder: Save measurements which were interrupted by occurrence of an error.
- "**NORM**" folder: Save measurements for runs without errors.
- "**SHOT**" folder: Save measurements which were made with the "Stop&Shot" function.

The actual number of runs is used as a file name (e.g. "00000109.ZR3" for 109 runs).

### 17.5.6 Saving configurations

The configurations of parameters can be saved on the memory card by allocating configuration numbers. The parameter list and the printer list are saved. The following folder structure is created on the memory card: **"4CX\CONFIG\configuration number"**. Parameter lists are saved with the file extension ".PA4" and printer lists with the file extension ".PRT".



#### Information

If two configurations are saved under the same configuration number, the existing configuration is overwritten.

#### Saving configurations

```
Statistics
->Memory card
MMC recorder
Encoder adjust.
```



```
Memory card
↳ SAV_CFG 0
  ↳ 1
```



```
Copy1:
-----
```



```
Memory card
UPDATE 0
-> SAV_CFG 0
LOD_CFG 0
```

Select **"Memory Card"** menu

Confirming menu selection

Select **"SAV\_CFG"** parameter

Confirming menu selection

**Line 3:** Enter configuration number ("1" in this example)

Confirm with the key.

The parameter list and the printer list are saved.

After the data backup the **"Memory Card"** menu is displayed again.

### 17.5.7 Loading configurations

Saved configurations of parameters can be loaded from the memory card into the ZAdyn4Bplus by entering the respective configuration number. The parameter list saved in the "CONFIG" folder is loaded into the ZAdyn4Bplus for this.

#### Loading configurations

```
Statistics
->Memory card
MMC recorder
Encoder adjust.
```



```
Memory card
↳ LOD_CFG 0
  ↳ 1
```



```
please wait...
-----
```

Select **"Memory Card"** menu

Confirming menu selection

Select **"SAV\_CFG"** parameter

Confirming menu selection

**Line 3:** Enter configuration number ("1" in this example)

Confirm with the key.

The parameter list and the printer list are loaded.  
The frequency inverter performs a reset after loading.

## 17.6 Checking the motor phases

To avoid undefined motor activities due to wrong connection, short circuit, broken wires, etc, the motor phases will be checked during the start procedure. Therefore the current in the phases U/V/W will be measured before the brakes are opening.

The monitoring function extends the start-up procedure by approx. 300 ms. In the case of the factory setting "Single" and the correct test result, this only happens during initial travel once the frequency inverter has been switched on.

If during the inspection an error is detected the error message **E412 - MOT:UVW fail** is displayed.

The different monitoring functions can be selected in the menu **ZA-Intern/UVW\_CHK**. The factory setting is "Single".

Function	Designation
<b>Single</b>	The motor phases are checked during initial travel once the frequency inverter has been switched on. If the check is successful, no further monitoring is performed. If the examination is incorrect, with each start an examination is made until a correct examination could be accomplished.
<b>Cont</b>	Motor phases will be checked with each travel
<b>Off</b>	Checking of the motor phases is deactivated

The testing voltage can be selected in the menu **ZA-Intern/UVW\_PEK**. The factory setting is "f(P)".

Function	Designation
<b>f(P)</b>	The testing voltage depends on the nominal voltage of the motor, which is entered in the menu <b>"Motor name plate"</b> . In case of an error the testing voltage is displayed in the error message.
<b>1V ... 10V</b>	Selecting the testing voltage between 1 V and 10 V. In case of an error the testing voltage is displayed in the error message.
<b>15V</b>	Test voltage 15 V.

### Error "E412 - MOT:UVW fail" occurs, but the motor connection is correct

If the error "E412 - MOT:UVW fail" occurs even though the motor is connected correctly, maybe the testing voltage is too small. The testing voltage has to be increased manually.

## 17.7 Field weakening



The operation with field weakening is only possible with asynchronous motor.

If the required motor speed  $n^*$  for an asynchronous motor is above the nominal speed  $n$  of the motor, the ZAdyn4Bplus automatically switches over to operation in the field weakening range. In operation with field weakening the magnetizing current  $I_0$  is reduced over the complete speed range of the motor. The  $\cos \phi$  of the motor data will be increased. Thereby the required speed will be reached.

The original and the new calculated motor data can be compared in the **Info/page05** menu.

### 17.8 Operation with a 3-phase 230 VAC power supply

The ZAdyn4Bplus can be operated with a 3~ 230 VAC power supply.

For this purpose, it is only necessary to adapt various monitoring functions to the lower power supply.

```
Power unit
↳ UDC_N 325 V
↳ 325
Nominal DC voltage
```

In the menu "Power section" configure the parameter "UDC\_N=325 V"



```
Power unit
↳ UDC_MIN 250 V
↳ 250
Min. DC-link voltage
```

In the menu "Power section" configure the parameter "UDC\_MIN=250 V"



```
Power unit
↳ UDC_MAX 760 V
↳ 760
Max. DC voltage
```

In the menu "Power section" configure the parameter "UDC\_MAX=760 V"



```
Power unit
↳ U_BC 650 V
↳ 650
BC intervention voltage
```

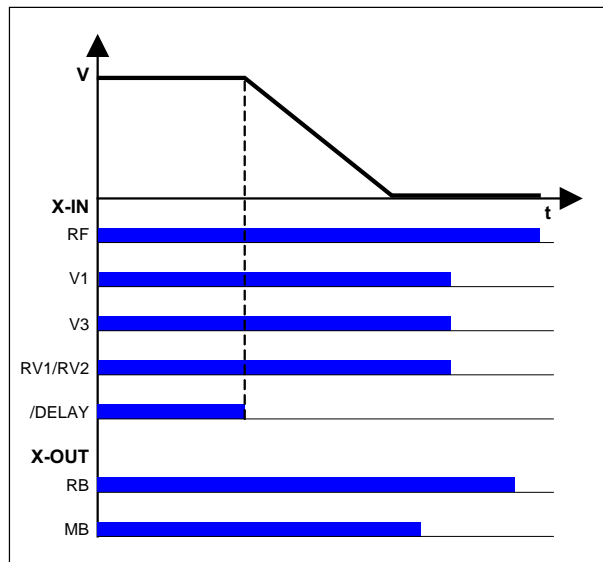
In the menu "Power section" configure the parameter "U\_BC=650 V"

### 17.9 Controlled emergency stop in inclined elevators

If an emergency stop is implemented in inclined elevators by suddenly closing the brakes, the abrupt stop can lead to injury to passengers. To avoid this, the cabin should also be braked controlled in emergency stop.

The **/FastStp** input function is available for this purpose.

When deactivating the input using the **/FastStp** function, the motor is decelerated with the deceleration configured in the **Control/A\_MAX** menu (see Fig.).



Controlled emergency stop

*RF* Controller enable

*V1* Positioning speed

*V3* High travelling speed

*RV1 / RV2* Direction

*/DELAY* Delay in emergency stop

*RB* Controller ready

*MB\_Brake* Mechanical brake

### 17.10 Travel direction counter

This function is a reverse counter that counts the permitted number of changes of direction and informs the operator of the elevator system in good time about necessary replacement of the suspension means.

#### 17.10.1 Parameters for the travel direction counter

For the travel direction counter there are the following parameters, available in the menu **Statistic**. In order to be able to use all parameters, the password **TD\_PWN** must be assigned first.

Parameter	Designation	Value range	Factory setting
<b>TD_PWN</b>	New password A number between 1 and 9999 can be used as a password If the password is set to 0, the direction change counter is deactivated.	0 ... 9999 0 = no password	0
<b>TD_PWC</b>	Displays the password in coded form. If you lose the password, please contact the manufacturer.	nicht einstellbar	21689
<b>TD_PW</b>	Enter password.	0 ... 9999	0
<b>TD_SET</b>	Initial value of the down counter	0.00 ... 10.00 M	0.00
<b>TD_RST</b>	Restore the counter reading from the absolute value encoder	On Off	Off

The current counter readings and the start value for the direction change counter are also available in the **info menu** on the **TravelDirection** page.

#### 17.10.2 Activating the travel direction counter

For using the travel direction counter, the following parameters have to be adjusted.

```
Statistics
↳ TD_PWN 0
  ↳ 0
*New password
```

Assign a new password in the **Statistic/TD\_PWN** parameter. If there is already a password existing, you have to enter it to "TD\_PW" before it can be replaced by a new password.

```
Statistics
TD_PWN 0
->TD_PWC 21689
*Encrypted password
```

The **Statistic/TD\_PWC** parameter indicates the password in coded form. With the coded password the ZIEHL-ABEGG SE can decode the original password. For example if the owner has forgotten it.

```
Statistics
↳ TD_PW 0
  ↳ 0
*Password entry
```

Before every change to TD\_SET, the previously assigned password must be entered in the **Statistic/TD\_PW** parameter.

```
Statistics
↳ TD_SET 0 M
  ↳ 0
* Down counter start value
```

Enter the maximum number of changes of direction in the **Statistic/TD\_SET** parameter.



#### Information

The maximum number of changes of direction for the **Statistic/TD\_SET** parameter is 16.67 million.

CAUTION!

#### Caution!

When the ZAdyn4Bplus is replaced, the current counting value of the down counter "TD\_CNT" must be transferred to the new ZAdyn4Bplus!

### 17.10.3 Deactivating the travel direction counter

To deactivate the direction change counter, the following parameters have to be adjusted.

```
Statistics
↳ TD_PW 0
↳
↳ 0
*Password entry
```

Enter the previously assigned password in the **Statistic/TD\_PW** parameter.

```
Statistics
↳ TD_SET 0 M
↳
↳ 0
* Down counter start
value
```

Enter "0" in the **Statistic/TD\_SET** parameter.

```
Statistics
↳ TD_PW 0
↳
↳ 0
*Password entry
```

Enter the previously assigned password again in the **Statistic/TD\_PW** parameter.

```
Statistics
↳ TD_PWN 0
↳
↳ 0
*New password
```

Enter "0" in the **Statistic/TD\_PWN** parameter.

### 17.10.4 Configuring an activated travel direction counter

If a travel direction counter has already been activated, its functions are blocked by a password. This can be recognised by the fact that "56366" is displayed in the **Statistic/TD\_PWC** parameter.

```
Statistics
TD_PWN 0
->TD_PWC 56366
```

In order to make subsequent changes to an activated travel direction counter, the previously assigned password must be entered in the **Statistic/TD\_PW** parameter.

```
Statistics
↳ TD_PW 0
↳
↳ 0
*Password entry
```

### 17.10.5 Output functions

Two special counter functions can be assigned to the digital outputs of the ZAdyn4Bplus when using the travel direction counter:

Parameter	Function	Explanation
<b>Suspension means info</b>	Suspension means replacement necessary	Contact closes if the current suspension means can be used for approx. 1 more year. Contact stays close until the down-counter will be reset.
<b>TD_CNT ext.</b>	Monostable trigger circuit	The output relay gives an impulse to the output at every travel direction change. For connecting an external counter, e.g. in the control system



### 17.10.6 Resetting the travel direction counter



#### Information

At the end of the maximum change of direction, the ZAdyn4Bplus is locked and the error "**E950 TD\_CNT: Drive limit**" appears on the display.

To enable the cabin to be moved to the position for replacement of the suspension means after locking the frequency inverter, the ZAdyn4Bplus must be switched off and back on. Further travel is then possible.

After successfully replacing the suspension means, the password has to be entered in the **Statistics** menu and the reverse counter set to a new initial value:

```
Statistics
↳ TD_PW 0
  ↳ 0
*Password entry
```

Enter the current password in the **Statistic/TD\_PW** parameter to enable the down counter value to be reset.

```
Statistics
↳ TD_SET 0 M
  ↳ 0
* Down counter start
value
```

Enter "0" in the **Statistic/TD\_SET** parameter.


```
Statistics
↳ TD_PW 0
  ↳ 0
*Password entry
```

Enter the current password in the **Statistic/TD\_PW** parameter.

```
Statistics
↳ TD_PWN 0
  ↳ 0
*New password
```

Enter "0" in the **Statistic/TD\_PWN** parameter.

After successfully setting the down counter the number of counter resets "**TD\_RES**" is increased by one.

To display the current value of TD\_RES, in the **info menu** on the **TravelDirection** page, press the  key.

**17.10.7 Restore the counter reading from the absolute value encoder**

The counting value of the travel direction change counter is automatically saved in the absolute value encoder. This is performed at the following intervals:

- every 100 changes in direction up to 1,000 changes in direction
- every 1,000 changes in direction up to 10,000 changes in direction
- every 3,000 changes in direction from 10,000 changes in direction

The function is possible in absolute value encoders with EnDat, Codeface and Hiperface interface.

The current counter reading can be loaded into the ZAdyn from the absolute value encoder:

```
Statistics
↳ TD_PW 0
  ↳ 0
*Password entry
```

Enter the current password in the **Statistic/TD\_PW** parameter.

```
Statistics
↳ TD_RST OFF
  ↳ ON
* Restore counter reading
```

Set the **Statistic/TD\_RST** parameter to "ON".

The counter reading is restored and can be seen in the **Info menu** on the **TravelDirection** page in the **TD\_CNT** parameter.

**17.11 Self-monitoring of the brakes according to EN81-20**

The operating brakes can be used as brake elements for protection against unintentional movement of the car. The micro-switches on the brakes are used for the required self-monitoring. Monitoring can take place both with normally closed contacts (NC) and normally open contacts (NO). The type of monitoring contact can be selected in the input programming.

**17.11.1 Activation of the self-monitoring**

The self-monitoring is activated by selecting the brake circuits count and the function of the micro-switch based on the "BR" parameter in the "Startup" or "Monitors" menu (e.g. 2 brake circuits with normally open function of the microswitches: BR=2xNO).

```
Monitoring
↳ BR 2*NO
  ↳ 2*NO
Brake Control
```

```
Startup
↳ BR 2*NO
  ↳ 2*NO
Brake Control
```

**17.11.2 Activating the ZAdyn lock in case of a malfunctioning brake circuit**

The lock function on the ZAdyn is engaged by activating the "LOCK\_X=On" parameter in the "Monitoring" menu.

```
Monitoring
↳ LOCKBR Off
  ↳ On
Lock on malfunction
```

Activation of the parameter ensures that the ZAdyn locks upon detection of a faulty brake circuit. The ZAdyn lock can only be released by setting the "Monitoring / UNLOCK = On" parameter.

### 17.11.3 Function test of the self-monitoring

#### Function test according to EN81-50

The self-monitoring test required according to EN81-50 chapter 5.8.3.2.5 is performed for every software version during internal software tests at ZIEHL-ABEGG.

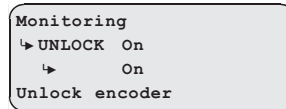
For this, 10 test runs are made and the function of the self-monitoring checked.

#### Function test in start-up

If the drive unit brakes are used as brake elements for protection against unintended movement of the car, a function test of the self-monitoring must be made during start-up.

##### Test step 1

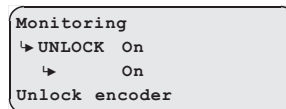
1. Disconnect signal cable at a monitor input.
2. Perform test run.
3. The error message "380 BR:Start Error" (monitor function "NCC") or "582 BR:T2 too small" (monitor function "NOC") must be output already at the start, otherwise the monitor is faulty.
4. The ZAdyn locks, no further travel is possible.
5. Re-connect the signal cable.
6. Repeat the test run to check the lock. A new run may not be possible, the ZAdyn is still locked.
7. Release the lock by setting the "Monitoring / UNLOCK = On" parameter (see display).
8. Start new run, this must take place without errors.



Repeat test step 1 for every monitor input.

##### Test step 2

1. Disconnect the signal cable at a monitor input and short circuit the monitor input with the internal 24V DC voltage source of the ZAdyn.
2. Perform test run.
3. The error message "380 BR:Start Error" (monitor function "NOC") or "582 BR:T2 too small" (monitor function "NCC") must be output already at the start, otherwise the monitor is faulty.
4. The ZAdyn locks, no further travel is possible.
5. Remove short-circuit and re-connect the signal cable.
6. Repeat the test run to check the lock. A new run may not be possible, the ZAdyn is still locked.
7. Release the lock by setting the "Monitoring / UNLOCK = On" parameter (see display).
8. Start new run, this must take place without errors.



Repeat test step 2 for every monitor input.

## 17.12 Support with acceptance test

### 17.12.1 Rotary encoder test

The function uses software to simulate rotary encoder failure.

#### Performing rotary encoder test

```
Power unit  
-> Checks  
ZA-Intern
```

Select "**Checks**" menu



```
Checks  
↳ SCY_EN OFF  
  ↳ ON  
Enable tests
```

Select parameter "**SCY\_EN**"  
Enter "SCY\_EN=On"



```
Checks  
↳ SCY_ENC OFF  
  ↳ ON  
Encoder test
```

Select parameter "**SCY\_ENC**"  
Switch on rotary encoder test with "SCY\_ENC=ON"

Then send a travel signal. Travel is aborted with an error message, as the rotary encoder is deactivated.



#### Information

The test function can also be activated during travel.

### 17.12.2 Motor temperature test

The function simulates failure of the motor temperature module or overtemperature on the motor by software.

#### Perform motor temperature test

```
Power unit  
-> Checks  
ZA-Intern
```

Select "**Checks**" menu



```
Checks  
↳ SCY_EN OFF  
  ↳ ON  
Enable tests
```

Select parameter "**SCY\_EN**"  
Enter "SCY\_EN=On"



```
Checks  
↳ SCY_TMP OFF  
  ↳ ON  
Engine temp. monitor
```

Select parameter "**SCY\_TMP**"  
Switch on motor temperature test with "SCY\_TMP=ON"

After completing the motor temperature test, the "MOT:Temp. -Alarm" error (error 575) is output when starting up.



#### Information

The test function can also be activated during travel.

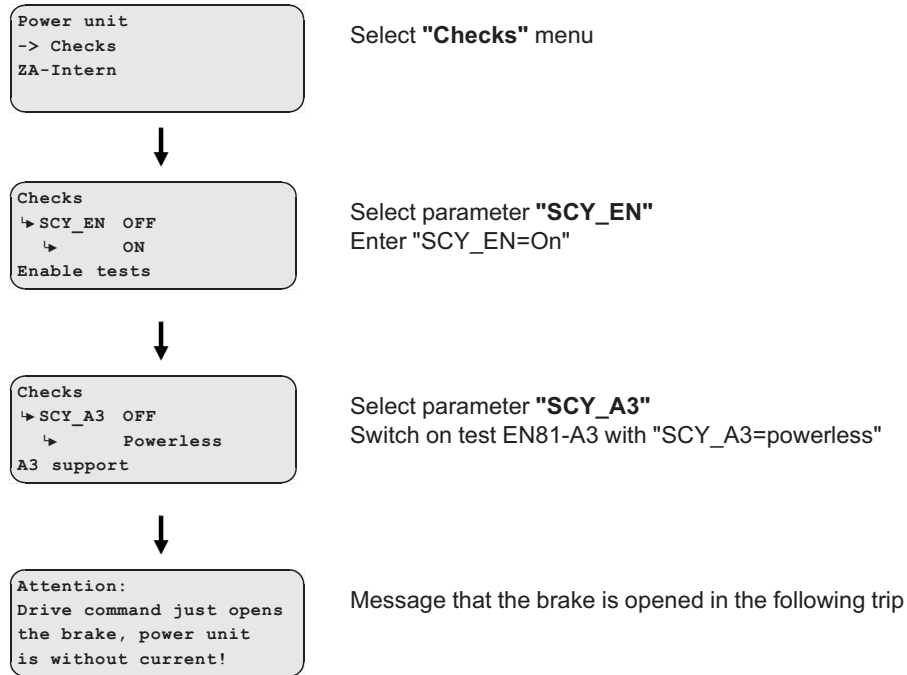
### 17.12.3 Testing of the protection device according to EN81-A3

Testing of the protection device according to EN81-A3 to prevent accidental movement of the cabin from the stopping point.

#### 17.12.3.1 Powerless drifting of the cabin from the floor

The output stage is switched off, the motor brake open, the cabin drifts away.

#### Perform testing of protection device according to EN81-A3 with powerless drifting



#### Danger!

- The motor is not powered and drifts in the direction of the pulling load!
- The monitor functions of the ZAdyn are deactivated. There is a risk for the system and persons due to uncontrolled movement of the lift.

#### 17.12.3.2 Travel with maximum acceleration from floor

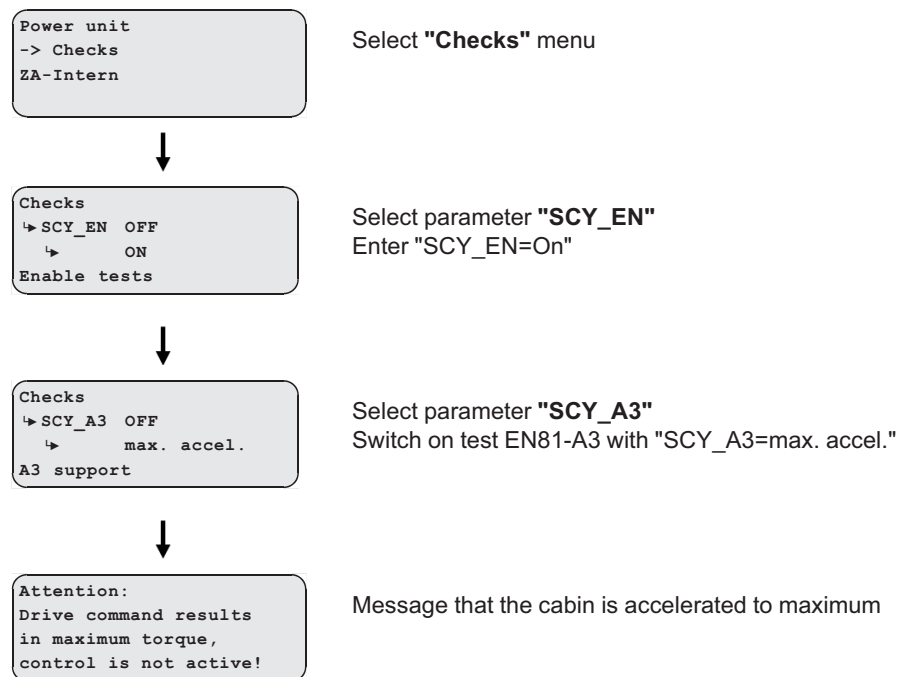
The output stage is switched on, the brakes are open, the cabin is accelerated to maximum under full power.

CAUTION!

#### Attention!

- Do not perform testing of the protection device according to EN81-A3 "Travel with maximum acceleration from floor" if the motor already has high temperature because the motor will be heated up even more by the maximum acceleration.
- The motor can be demagnetised by testing the protective device according to EN81-A3 "Travel with maximum acceleration from floor". ZIEHL-ABEGG provides no guarantee for motors that do not originate from ZIEHL-ABEGG.

### Perform testing of protection device according to EN81-A3 with maximum acceleration



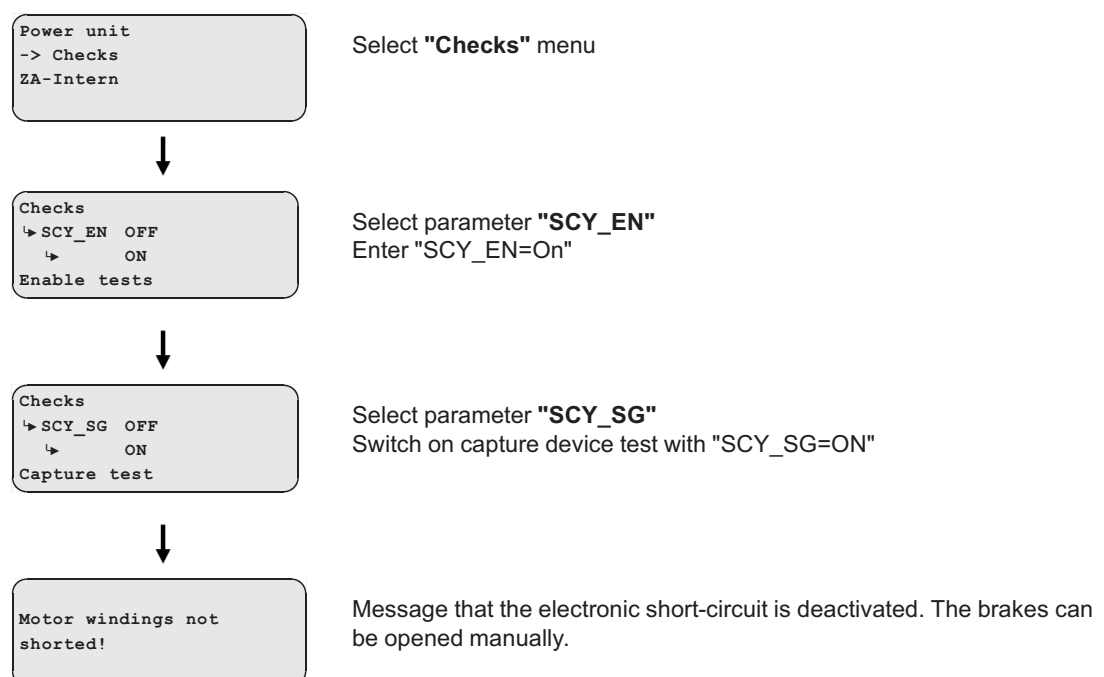
#### Danger!

- The monitor functions of the ZAdyn are deactivated. The maximum acceleration of the lift poses a risk to persons and the system.

#### 17.12.4 Capture device test

The function deactivates the electronic short-circuit. The brakes must be opened manually after switching on the function.

#### Perform capture device test





**Danger!**

The monitor functions of the ZAdyn are deactivated. There is a risk for the system and persons due to uncontrolled movement of the lift.

**17.12.5 Driving capability test**

The cabin is moved up with the counterweight applied. The cabin movement is shown in the display.



**Information**

The function is only possible in connection with CAN activation.

**Perform driving ability test**

```
Power unit  
-> Checks  
ZA-Intern
```

Move up with the recovery control until the counterweight is resting on the buffer.

Select "**Checks**" menu

```
Checks  
↳ SCY_EN OFF  
↳ ON  
Enable tests
```

Select parameter "**SCY\_EN**"  
Enter "SCY\_EN=On"

```
Checks  
↳ SCY_DA OFF  
↳ ON  
Driving capability test
```

Select parameter "**SCY\_DA**"  
Switch on driving ability test with "SCY\_DA=ON"

Move up with recovery control until the cables slip over the traction sheave.

```
Difference in cabin posi-  
tion  
+ 13mm
```

Display cabin movement

### 17.12.6 Engine brakes test

The function interrupts the safety circuit during travel. The distance covered by the cabin before coming to standstill is shown in the display.



#### Information

The function is only possible in connection with CAN activation.

#### Perform motor brakes test

```
Power unit  
-> Checks  
ZA-Intern
```

Select "**Checks**" menu



```
Checks  
↳ SCY_EN OFF  
  ↳ ON  
Enable tests
```

Select parameter "**SCY\_EN**"  
Enter "SCY\_EN=On"



```
Checks  
↳ SCY_MB OFF  
  ↳ ON  
Engine brakes test
```

Select parameter "**SCY\_MB**"  
Switch on motor brakes test with "SCY\_MB=ON"

Give travel command up with empty cabin  
Interrupt safety chain



```
Difference in cabin posi-  
tion  
+ 13mm
```

Display distance up to standstill



### 17.13 Electronic name plate

With the "electronic rating plate" function, you can store parameters from the ZAdyn4Bplus in an absolute value encoder or load data from an absolute value encoder into the ZAdyn4Bplus. The function is possible in rotary encoders with EnDat, Codeface and Hiperface interfaces.

#### Save data

```
MMC recorder  
-> Encoder-adjust.  
Safety gear  
HW-Ident.
```

Select menu **Encoder adjustment**



```
Encoder adjust.  
↳ SAV_P_E OFF  
↳ ON  
Parameters on encoder
```

Select parameter "**SAV\_P\_E**"  
Enter "SAV\_P\_E=On"

#### Load data

In order to be able to load data from the absolute value encoder, you must have stored the data in the absolute value encoder with the ZAdyn4Bplus first.

```
MMC recorder  
-> Encoder-adjust.  
Safety gear  
HW-Ident.
```

Select menu **Encoder adjustment**



```
Encoder adjust.  
↳ LOD_P_E OFF  
↳ 27  
Parameters from encoder
```

Select parameter "**LOD\_P\_E**"  
Enter "LOD\_P\_E=27" to load data

## 18 Auto tuning asynchronous motors

### 18.1 General

With asynchronous motors the motor data are often unavailable or the data specified on the name plate are not correct. The optimum operating data for the motor are determined with the Autotune function.

The Autotune function can also be performed using the ZAmoMobile app.



### 18.2 Determining the operating data with the Autotune function


- The autotune function must be carried out at a motor temperature <math><40\text{ }^\circ\text{C}</math>.
- Before starting the auto tuning, move the empty cabin to the top stop. Correct connection of the rotary encoder and correct connection of the motor (in phase) is a prerequisite for correct functioning.

If the weight balancing is 40 %, there is not sufficient reserve to move the elevator with nominal load at nominal speed when performing the auto tune function, which assumes 50 % weight. There are several possible ways to prevent this:

- Reduce the **Motor name plate/U\_Trim** parameter to 300-310 V. This frees up reserves for travelling with nominal load.


<b>Step 1</b>	<p>Enter parameters in menu <b>Installation</b>.</p> <ul style="list-style-type: none"> <li>• <math>V^*</math> = 90 % of nominal speed of the lift</li> <li>• MOD_n* = calculate</li> <li>• n* = Calculated automatically</li> <li>• __D = diameter of the traction sheave</li> <li>• __iS = suspension</li> <li>• __i1 = i1 of the gear ratio i1:i2</li> <li>• __i2 = i2 of the gear ratio i1:i2</li> </ul>
<b>Step 2</b>	<p>Enter the parameters in the <b>Travel</b> menu.</p> <ul style="list-style-type: none"> <li>• <math>V_3 = V^*</math> (nominal speed of the installation)                      In CANopen lift operation, this speed has to be configured in the control.</li> </ul>

<b>Step 3</b>	<p>First of all the value that has to be entered for the <b>Motor name plate/f</b> parameter has to be calculated. This is done by carrying out the following steps 1-3.</p> <p>1. Calculation of the number of pole pairs using the data on the name plate:  <math>p = f \times 60 / n</math></p> <p>2. Calculation of the nominal frequency using the value of <math>n^*</math> calculated in step 1 of the auto tune function and the calculated number of pole pairs. Use the integer proportion for <math>p</math>:  <math>f = n^* \times p / 60</math></p> <p>3. Add 1.5 Hz to the calculated nominal frequency value:  <math>f = f + 1.5 \text{ Hz}</math></p> <p>Enter the calculated value for the <b>Motor name plate/f</b> parameter.</p> <p style="text-align: center;">Enter the following additional parameters in the <b>Motor name plate</b> menu.</p> <ul style="list-style-type: none"> <li>• <math>n = n^*</math> -&gt; calculated motor speed <math>n^*</math></li> <li>• <math>I</math> = Motor name plate specification (if not specified: <math>I[A] = \text{Power [kW]} \times 2</math>)</li> <li>• <math>\cos \phi</math> = specification of motor nameplate (if there is no specification: <math>\cos \phi = 0,88</math>)</li> </ul>
<b>Step 4</b>	<p>Travel <b>down</b> with empty cabin at inspection speed.</p> <p>If the drive does not start or travel is aborted with an error message, in the <b>Motor nameplate</b> menu increase the nominal frequency for the <b>f</b> parameter in 1 Hz increases until the elevator travels down.</p>

<b>Step 5</b>	Drive the cabin to the top floor.
<b>Step 6</b>	<p>In the <b>Motor nameplate</b> menu, set the parameter <b>ASM_ID =One-Step</b>.          -&gt; After confirmation, the display changes to the Info menu 22</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>ASM_ID ----- 22 1420rpm 19.7A 9.6A 50.5Hz 340V 278ms 0.76cos &lt;WAIT &gt;</pre> </div>
<b>Step 7</b>	Give a call to the bottom floor.
<b>Step 8</b>	<p>At the end of travel, one of the following displays appears:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>Good, Factor x.x --- Accept values determined? [No] [Yes]</pre> </div> <p>The operating data was determined correctly.  <math>x.x</math> specifies the factor, by which the original values were corrected, e.g. "1.2".          if the  key is pressed, the data are saved automatically. The process is finished then.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>U:LIMIT -----</pre> </div> <p>Determination of the operating data was not completed correctly because the voltage limit of the ZAdyn was reached. The <b>Motor nameplate/U_TRIM</b> parameter must be set to a lower value. The parameter is only visible if the <b>Motor nameplate/ASM_ID=ON</b> parameter is configured. Steps 1-8 must be repeated.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>f:LIMIT -----</pre> </div> <p>The operating data could not be determined correctly, as the slip limit was reached. The slip limit must be increased in the <b>Motor nameplate/f_SLIP</b> parameter. To do this, the <b>Motor nameplate/f_SLIP=15 Hz</b> parameter has to be configured. The parameter is only visible if the <b>Motor nameplate/ASM_ID=ON</b> parameter is configured. Steps 1-8 must be repeated.</p>

**Increase in the nominal system speed to 100 %**

This is carried out in two stages: First, the system nominal speed is set to 95 % and steps 1-6 are carried out. If the data could be determined correctly, the system nominal speed is set to 100 % and steps 1-6 are repeated.

<p><b>Step 1</b></p>	<p>Adjust parameters in menu <b>Installation</b>.</p> <ul style="list-style-type: none"> <li>• <math>V^*</math> = 95 % of nominal speed of the lift</li> <li>• <math>n^*</math> = is calculated automatically (expected value ca. 1425 min<sup>1</sup>)</li> </ul> <p>Enter the parameters in the <b>Travel</b> menu.</p> <ul style="list-style-type: none"> <li>• <math>V_3 = V^*</math> (nominal speed of the installation)</li> </ul> <p>In CANopen lift operation, this speed has to be configured in the control.</p>
<p><b>Step 2</b></p>	<p>Adjust parameters in the <b>Motor nameplate</b> menu.</p> <ul style="list-style-type: none"> <li>• <math>n = n^*</math> -&gt; calculated motor speed <math>n^*</math></li> </ul>
<p><b>Step 3</b></p>	<p>In the <b>Motor nameplate</b> menu, set the parameter <b>ASM_ID =One-Step</b>.</p> <p>-&gt; After confirmation, the display changes to the Info menu 22</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>ASM_ID ----- 22 1420rpm 19.7A 9.6A 50.5Hz 340V 278ms 0.76cos &lt;WAIT &gt;</pre> </div>
<p><b>Step 4</b></p>	<p>Drive the cabin to the top floor.</p>
<p><b>Step 5</b></p>	<p>Give a call to the bottom floor.</p>
<p><b>Step 6</b></p>	<p>At the end of travel, one of the following displays appears:</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>Good, Factor x.x --- Accept values determined? [No] [Yes]</pre> </div> <p>The operating data was determined correctly.  x.x specifies the factor, by which the original values were corrected, e.g. "1.2".  if the  key is pressed, the data are saved automatically. The process is finished then.  If the data could not be determined correctly, the <b>page 22</b> of the <b>Info menu</b> is displayed.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>U:LIMIT -----</pre> </div> <p>Determination of the operating data was not completed correctly because the voltage limit of the ZAdyn was reached. The <b>Motor nameplate/U_TRIM</b> parameter must be set to a lower value. The parameter is only visible if the <b>Motor nameplate/ASM_ID=ON</b> parameter is configured. Steps 1-6 must be repeated.</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <pre>f:LIMIT -----</pre> </div> <p>The operating data could not be determined correctly, as the slip limit was reached. The slip limit must be increased in the <b>Motor nameplate/f_SLIP</b> parameter. To do this, the <b>Motor nameplate/f_SLIP=15 Hz</b> parameter has to be configured. The parameter is only visible if the <b>Motor nameplate/ASM_ID=ON</b> parameter is configured. Steps 1- 6 must be repeated.</p>

## 19 Enclosure

### 19.1 Technical data for ZAdyn4Bplus

	ZAdyn			
	4Bplus 110	4Bplus 150	4Bplus180	4Bplus 220
<b>Electrical data</b>				
Mains connection voltage [V]	3~ 180 ... 440 absolut			
Mains frequency [Hz]	50 / 60 (±1,5 Hz)			
Network form	TT / TN			
Typ. motor output (400 V) [kW]	55	75	90	110
Duty cycle at rated current and clock frequency 8 kHz [%]	60			
Nominal current for 60%ED and clock frequency 8 kHz fixed at ambient temperature 40 °C [A]	110	150	180	220
Max. operating current (for max. 3s) [A]	198	270	324	330
Power loss at rated current, switching frequency 8 kHz and 60 % duty cycle** [W]	1250	1710	2000	2500
Power losses during standstill [W]	40	47		
Power loss in stand-by 1 [W]	36	43		
Power loss in stand-by 2 [W]	34	41		
Switching frequency [kHz]	3.7 ... 8			
Motor frequency [Hz]	max. 200			
Terminal cross-section mains / motor [mm <sup>2</sup> ]	95			
Min. cable cross-section Brake-Chopper / Brake-Resistor [mm <sup>2</sup> ]	16,0			
<b>Ambient conditions***</b>				
Protection rating	IP10			
Ambient temperature for operation [°C]	0 ... 55*			
Relative humidity [%]	90 / condensation prohibited			
Installation height [m über NN]	up to 2000 from 1000 m power reduction by 1 % per 100 m			
Storage and shipping temperature [°C]	-20 ... +60			
<b>Physical data</b>				
Degree of soiling (in acc. with DINEN61800-5-1):	2			
Power terminal tightening torque [Nm]	10 - 20			
Weight [kg]	57,0		63,0	
Dimensions h x w x d [mm]	1110 x 435 x 314			

\* Above 40°C, there is an automatic reduction in the clock frequency at an increased heat sink temperature (Power unit/M\_PWM=AUTO menu)

\*\* including radio interference filter and line reactor

\*\*\* The user must ensure that the specified ambient conditions are observed.

## 19.2 Adjustment card

### "Motor nameplate" menu

MOT_TYP	
n	
f	
p	
l	
U	
P	
TYP	
cos phi <sup>1)</sup>	
M_Max	

### Encoder & BC menu

ENC_TYP	
ENC_INC	
BC_TYP	

### Installation menu

V*	
MOD_n*	
n*	
__D	
__iS	
__i1	
__i2	
Q <sup>1)</sup>	
F <sup>1)</sup>	
G <sup>1)</sup>	

<sup>1)</sup> The parameter is only visible if "MOT\_TYP=ASM" is selected.

### Control system menu

CONFIG	
MO_DR	
CTRL	
f_I01	
f_I02	
f_I03	
f_I04	
f_I05	
f_I06	
f_I07	
f_I08	
f_XBR1	
f_XBR2	
f_XBR3	
f_XBR4	
f_O1	
f_O2	
f_O3	
f_O4	
V_G1	
V_G2	
V_G3	
SIM_V1	
S_B_OFF	

### Monitoring menu

MOD_ST	
STO	
CO	
BR	
LOCK_X	
UNLOCK	
P1P2	
T_ENC	
I_MAX	
T_I_MAX	
APC	
MASK1	
MASK2	
MASK3	
MASK4	
MASK5	

### Start menu

M_START	
K_START	
T_0	
T_1	
T_2	
T_3	
V_T3	
BRK_DMP	

### Acceleration menu

A_POS	
R_POS1	
R_POS2	

### Travelling menu

V_1	
V_2	
V_3	
V_Z	
V_4	
V_5	
V_6	
V_7	

### Deceleration menu

A_NEG	
R_NEG1	
R_NEG2	
S_DI3	
S_DI2	
S_DI1	
S_ABH	

### Stop menu

T_4	
T_5	
T_5a	
T_5b	
T_6	

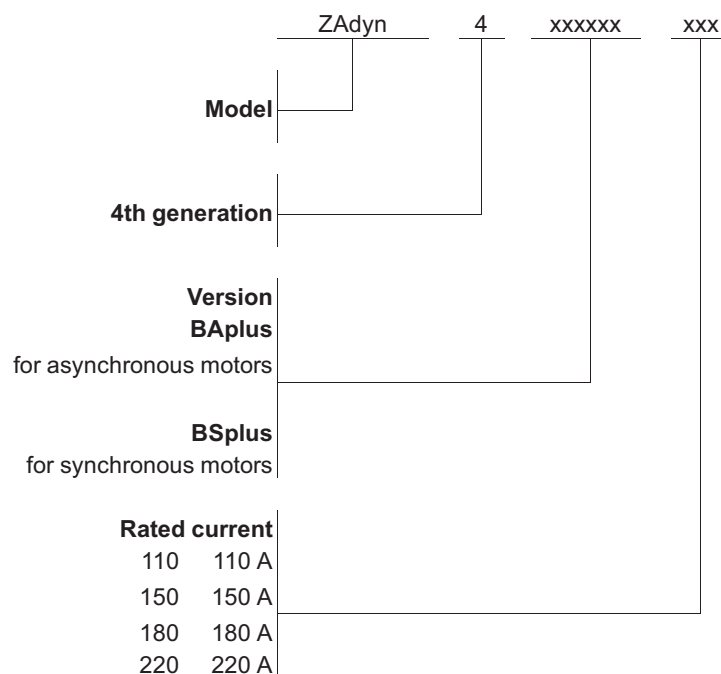
### Controller menu

SPD_KP	
SPD_TI	

### 19.3 Brake resistor allocation

Frequency inverter	Brake resistor	Part no.
ZAdyn4Bplus 110	BR100-A	357214
ZAdyn4Bplus 150		
ZAdyn4Bplus 180		
ZAdyn4Bplus 220		

### 19.4 Series



### 19.5 Part no.

A ZAdyn4Bplus for asynchronous motors		S ZAdyn4Bplus for synchronous motors	
ZAdyn4BAplus 110	352300	ZAdyn4BSplus 110	352310
ZAdyn4BAplus 150	352301	ZAdyn4BSplus 150	352311
ZAdyn4BAplus 180	352302	ZAdyn4BSplus 180	352312
ZAdyn4BAplus 220	352303	ZAdyn4BSplus 220	352313

## 19.6 EC/EU declaration of conformity

- Translation -  
(english)

A-KON16\_06-GB  
2023/29 Index 007

**Manufacturer:** ZIEHL-ABEGG SE  
Heinz-Ziehl-Straße  
74653 Künzelsau  
Germany

**The manufacturer shall bear sole responsibility for issuing this EC/EU declaration of conformity.**

**Product description:** Control devices ZAdyn/ZETADYN for elevator machines

Frequency inverters with a safe torque off (STO) function according to the Machinery directive 2006/42/EC, Annex IV, Nr. 21.

**Type:** ZAdyn4CA...  
ZAdyn4CS...  
ZETADYN 4CA...  
ZETADYN 4CS...  
ZAdynpro...  
ZAdyn4BAplus...  
ZAdyn4BSplus...

(The type details contain further additions concerning the version, e.g. ZAdyn4-CA 018 HY)

**Series number:** from  
30284129/0001

**The above mentioned products of this declaration fulfil all relevant provisions of the following Directives of the Union:**

Machinery directive 2006/42/EC

EMC Directive 2014/30/EU

Because of the accordance with the Machinery directive, the protection targets of the Low voltage directive 2014/35/EU are also fulfilled.



**The following harmonized standards have been applied:**

EN 61800-5-1:2007 +A1:2017 +A11:2021	Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy
EN 61800-5-2:2007	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional
EN 61800-3:2004 + A1:2012	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods
EN 12015:2014	Electromagnetic compatibility- Productfamily standard for lifts, escalators and moving walks - Emission
EN 12016:2013	Electromagnetic compatibility- Productfamily standard for lifts, escalators and moving walks - Immunity

**The following additional standards have been applied:**

EN 61800-5-2:2017	Adjustable speed electrical power drive systems - Part 5-2: Safety requirements - Functional
EN IEC 61800-3:2018	Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods

This declaration relates exclusively to the product in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

The authorised representative for the assembly of the technical file is:  
 Mr. Mathias Spannagel(see above for address).

Künzelsau, 19.07.2023  
 (Location, date of issue)

ZIEHL-ABEGG SE  
 Roland Hoppenstedt  
 Technical Director Drive Technology  
 (name, function)

ZIEHL-ABEGG SE  
 Mathias Spannagel  
 Head of Department Technics Electronics  
 Drive Technology  
 (name, function)

*i.V. R. Hoppenstedt*


*i.V. M. Spannagel*


(signature)

(signature)

## 2.7 Certificates

# Certificate





Functional Safety  
www.tuv.com  
ID 0600000000

**Nr./No.: 968/A 166.07/22**


<b>Prüfgegenstand</b> Product tested	Sicherheitsfunktion STO, Sicherer Halt (Stopp Kategorie 0) Safety Function STO, Safe Stop (Stop Category 0)	<b>Zertifikats- inhaber</b> <b>Certificate holder</b>	ZIEHL-ABEGG SE Heinz-Ziehl-Straße 74653 Künzelsau Germany
<b>Typbezeichnung</b> Type designation	ZETADYN 4 / ZAdyn4 / ZAdynpro Drive Family (für Einzelheiten siehe Revisions- Liste / for details see Revision List)		
<b>Prüfgrundlagen</b> Codes and standards	EN 81-20:2020 EN 81-50:2020 EN 61800-5-2:2017	EN 61800-5-2:2007 EN 81-1:1998 + A3:2009 EN 81-2:1998 + A3:2009	
<b>Bestimmungsgemäße Verwendung</b> Intended application	Sicheres Stillsetzen zur Anwendung in Personen- und Lastenaufzügen: Ersatz der Motorschütze zur Stillsetzung des Antriebes gemäß Safe stop for use at passenger lifts and goods passenger lifts: Replacement of contactors to stop the drive acc. to 5.9.2.5.4 d) or 5.9.3.4.2 d) of EN 81-20 or 12.7.3 a) of EN 81-1 or 12.4.1 a) of EN 81-2		
<b>Besondere Bedingungen</b> Specific requirements	Die Hinweise in der zugehörigen Installations- und Betriebsanleitung sowie dem Anhang zu diesem Zertifikat sind zu beachten. The instructions of the associated Installation and Operating Manual as well as the annex to this certificate shall be considered.		

Der Ausstellung dieses Zertifikates liegt eine Prüfung zugrunde, deren Ergebnisse im Bericht Nr. 968/A 166.07/22 vom 06.10.2022 dokumentiert sind.  
Dieses Zertifikat ist nur gültig für Erzeugnisse, die mit dem Prüfgegenstand übereinstimmen.  
The issue of this certificate is based upon an examination, whose results are documented in Report No. 968/A 166.07/22 dated 2022-10-06.  
This certificate is valid only for products which are identical with the product tested.

TÜV Rheinland Industrie Service GmbH  
Bereich Automation  
Funktionale Sicherheit  
Am Grauen Stein, 51105 Köln

Köln, 2022-10-13

Certification Body Safety & Security for Automation & Grid



Dipl.-Ing. Thomas Steffens

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Precisely Right.

2023-02-06



**Annex to Certificate 968/A 166.07/22**

1. Component	Safety-Function STO (ZETADYN 4 / ZAdyn4 / ZAdynpro) implemented as safety circuit containing electronic components	
2. Manufacturer	ZIEHL-ABEGG SE Heinz-Ziehl-Straße 74653 Künzelsau	
3. Designation / Nomenclature	see Revision Release List	
4. Intended application	Safe stop of the lift drive (Safe Torque Off (STO))	
5. Function indication	Safety Function STO / Safe Stop (Stop-Category 0) within the ZETADYN 4 / ZAdyn4 / ZAdynpro product family	
6. Intended use	Use at passenger and goods passenger lifts:  - Replacement of motor contactors for stopping the lift acc. to 5.9.2.5.4 d) und 5.9.3.4.2 d) of EN 81-20 or acc. to 12.7.3 a) of EN 81-1 or acc. to 12.4.1 a) of EN 81-2.	
7. Characteristics	Input voltage: STO_A – GND and STO_B – GND	typ.: 0 / 24 V DC LOW: 0 ... 3 V DC HIGH: 15 ... 30 V DC
	Input current: STO_A – GND and STO_B – GND	typ.: 12 mA (HIGH)
	turn-off time: (time between switching off the input signal(s) and disabling the power stage)	max. 50 ms (ZETADYN 4 / ZAdyn4C / ZAdynpro) max. 100 ms (ZAdyn4Bplus)
	Discrepancy time $t_v$	Max. allowed discrepancy time between STO_A and STO_B: $t_v < 120$ ms
	Software diagnostic: (not safety relevant)	if $t_v > 120$ ms then failure indication by frequency converter
	Hardware diagnostic:	$310$ ms $< t_v < 1600$ ms (typ. 700 ms) (when exceeded, the drive is locked out and can only be set in operation again by power cycling).
	Minimum demand rate of the STO function:	1/h for min. 1600 ms each
Working life:	After 20 years the device shall be replaced by a new one.	

2 Safety instructions

2023-02-06



	<p>Protection degree of enclosure: IP 20          (ZETADYN 4 / ZAdyn4C / ZAdynpro)          IP 10          (ZAdyn4Bplus)          The user is required to ensure pollution degree 2 acc. to EN 61800-5-1 by suitable measures or choice of the mounting location.</p> <p>Operating temperature: ZETADYN 4 / ZAdyn4C / ZAdynpro:          0 ... +55 °C          (above +40 °C reduction of rated power by 1,66 % per 1 K is required)</p> <p>ZAdyn4Bplus:          0 ... +55°C          (above +40 °C at increased heatsink temperature automatic reduction of the clock frequency)</p> <p>Humidity: &lt; 90 % rH (no condensation))</p> <p>Safety characteristics: SIL 3,</p> <p>ZETADYN 4 / ZAdyn4C / ZAdynpro:          PFH = 3,11E-10 1/h          MTTF<sub>d</sub> = 410 a (High)          DC<sub>avg</sub> = High</p> <p>ZAdyn4Bplus          PFH = 2,69E-10 1/h          MTTF<sub>d</sub> = 469 a (High)          DC<sub>avg</sub> = High</p>
<p>8. Maintenance</p>	<p>The frequency converter ZETADYN 4 / ZAdyn4 / ZAdynpro product family shall not be maintained by the end user. In case of failure, the device shall be replaced. The correct installation of the frequency converter and also the safety function STO needs to be checked regularly in accordance with the specifications stated in the manual.</p>
<p>9. Installation</p>	<p>The guidelines regarding installation, commissioning and operation shall be observed.</p> <ul style="list-style-type: none"> <li>- The relevant national regulations (e.g. VDE-directions) and the requirements of the EN 81-20 resp. EN 81-1/-2 shall be followed and the wiring shall conform to general EMC requirements.</li> <li>- External short circuits and cross faults on the wiring and terminals of the STO-signals must be excluded because the internal diagnostic of the ZETADYN 4 / ZAdyn4 / ZAdynpro is not able to detect short circuits on the wiring.</li> <li>- Supply lines (power-, motor cable) and STO-cables shall be spatially separated.</li> <li>- The cable length for STO signals must not exceed 50 m.</li> </ul>

2023-02-06



<p>10. Configuration</p>	<ul style="list-style-type: none"> <li>- The safety function STO is neither adjustable nor configurable.</li> <li>- Switching of the STO-signals shall be done by separate relays. (two channel operation).</li> <li>- It must be noted that the lift brakes are not operated by the STO function. Therefore the user shall ensure by appropriate electric circuits that the brakes are dropped when necessary.</li> </ul>
<p>11. Auxiliary conditions for a safe operation</p>	<ul style="list-style-type: none"> <li>- By selection of an appropriate mounting location it shall be ensured that environmental influences have no adverse effect on the safety circuit. In particular pollution degree 2 in accordance to EN 61800-5-1 shall be ensured by appropriate measures / mounting location.</li> <li>- In line with the commissioning and the periodical tests of the lift the following checks are required.             <ul style="list-style-type: none"> <li>- Check for correct installation</li> <li>- Check for hardware version</li> <li>- Test of the Safety Function.</li> </ul> </li> <li>- In case of a fault accumulation (defects of two or more power semiconductors), even at correct operation of the safety function STO, the motor shaft could turn for a maximum angle of <math>\varphi = (180^\circ / \text{number of pole pairs})</math>. Therefore the installation company shall ensure by risk analysis that this movement cannot cause any hazard.</li> <li>- A circuit breaker / fuse shall be installed in the power input of the frequency converter which disconnects the power in case of failures in the power stage.</li> <li>- It must be noted that up to 3 minutes after mains disconnection dangerous voltage is still present on the device (capacitor discharge time).</li> </ul>



## Declaration for trip direction change counter

Date of issue of original declaration : June 24, 2011  
Revision number : 4  
Revision date : 21-01-2022  
Requirements : EN 81-20:2020  
Project no. : P210323

### 1. General specifications

Name and address manufacturer : ZIEHL-ABEGG SE  
Heinz-Ziehl-Strasse  
74653 Künzelsau  
Germany

Description of the reviewed component : Safe trip direction change counter

Frequency inverter type : Type series ZETADYN and ZAdyn

Data of examination : April 2011 - June 2011, May 2016, November 2016, January 2022

Examination done by : A. van den Burg

Laboratory : None



## 2. Description of the component

We herewith declare that the trip direction change counter fulfils all requirements for application with below mentioned certificates:

- NL10-400-1002-130-01 Brugg CTP 8,1 G2 coated suspension ropes for lifts.
- NL15-400-1002-130-02 Brugg CTP 6.5 G2 coated suspension ropes for lifts.
- NL12-400-1002-166-01 Contitech Polyrope 25-6x2,0 Lift suspension means.
- KP 195/2 Drako PTX 300 coated suspension ropes for lifts.

For applications with comparable conditions the counter can also be used with other lift suspension means.

This declaration is based on ZIEHL-ABEGG document "Sicherer Zähler für Seil Brugg SDR 8,1 mm" of June 21, 2011 as described below.

The counter is part of the ZIEHL-ABEGG type ZETADYN and ZAdyn frequency inverter.

It consists of two digital counters, the counter "A" (Parameter "TD\_DRV") and the counter "B" (Parameter "TD\_CNT"), both counters only count the number of changes in direction, successive trips in the same direction are counted as one trip only. Counter "A" is used to collect the total number of trips, it is not possible to reset this counter also not by a reset of the frequency inverter nor by removing its power supply. Counter "B" is used to limit the amount of allowed trips, changing of allowable maximum number of trips or resetting is protected by a password, this password can be defined for each controller separately.

Approximately one year before the allowed number of trips is reached, the display of the frequency inverter shows the number of trips that are left until the lift will be blocked (the ropes shall be changed before).

The estimation of the time that is left is based on the history of lift use and is updated after each trip.

When the maximum number of trips is reached, the inverter is setting the fault-output and an error message is shown in the display.

The inverter will not accept new trip commands until counter "B" has received a reset. To be able to exchange the ropes, after each restart of the inverter, one additional trip is possible.

Every reset of counter "B" is registered in memory in order to be able to check the history.

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When the frequency inverter is interchanged by a new one, the contents of counter "B" must be copied from the old inverter into the new one.

With best regards,



A. van den Burg  
Product specialist Certification  
Liftinstituut BV





## TYPE EXAMINATION CERTIFICATE FOR LIFTCOMPONENTS

Issued by Liftinstituut B.V.

Certificate no. : NL12-400-1002-163-01      Revision no.: 6

Description of the product : Self-monitoring of the motor brake  
- as part of protection against unintended car movement.  
- as part of ascending car overspeed protection means.

Trademark : ZIEHL-ABEGG SE

Type no. : ZETADYN4, ZAdyn4, ZAdynpro

Name and address of the manufacturer : ZIEHL-ABEGG SE  
Heinz-Ziehl-Strasse  
74653 Künzelsau  
Germany

Name and address of the certificate holder : ZIEHL-ABEGG SE  
Heinz-Ziehl-Strasse  
74653 Künzelsau  
Germany

Certificate based on the following standard : EN 81-20:2020 clauses 5.6.6, 5.6.7 and 5.9.2.2.  
EN 81-50:2020 clauses 5.7 and 5.8.

Test laboratory : None

Date and number of the laboratory report : None

Date of type examination : January 2023

Additional document with this certificate : Report belonging to the type examination certificate  
no.: NL12-400-1002-163-01 Rev.6

Additional remarks : This revision replaces certificate NL12-400-1002-163-01 Rev.5 of  
11-11-2022

Conclusion : The product meets the standard referred to in this certificate  
taking into account any additional remarks mentioned above.

Certification decision by

W.G. Kasteleijn  
Product Manager Certification

Amsterdam  
Date : 03-02-2023  
Valid until : 11-11-2027

2 Safety instructions

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